Extron® Electronics

INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual

ISM 482

Integration Scaling Matrix Switcher

68-576-01 **Rev. G**
03 08

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und / oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente / tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación / mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja / alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过 。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class B Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

Quick Start — Integration Scaling Matrix Switcher

Installation

Step 1

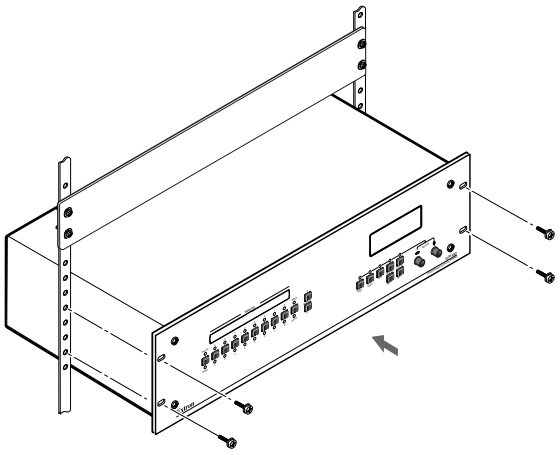
Turn off power to the ISM ISM 482 and the input and output devices, and remove the power cords from them.

Step 2

If desired, install an optional DVI output card into the switcher. See chapter 7, “Maintenance and Modifications”.

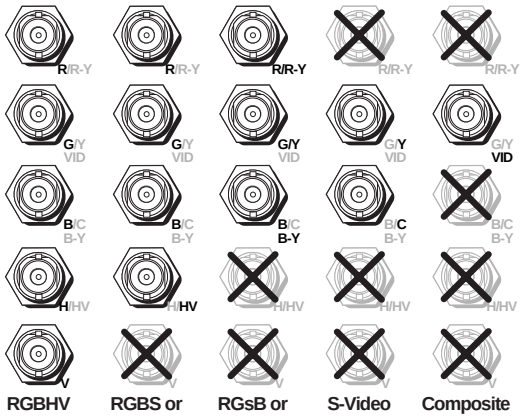
Step 3

Install four rubber feet on the bottom of the ISM or mount the ISM in a rack.



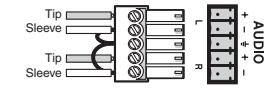
Step 4

Connect up to eight computer/RGB video, component video, S-video, or composite video sources to these female BNC input connectors. The figure below shows how to connect the various video formats.

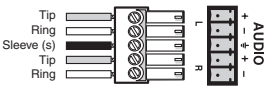


Step 5

Cable the switcher for audio input. Each input has a 3.5 mm, 5-pole captive screw connector for balanced or unbalanced stereo or mono audio input. Connectors are included with each switcher, but you must supply the audio cable. High impedance is generally over 800 ohms.



Unbalanced Input
(high impedance)

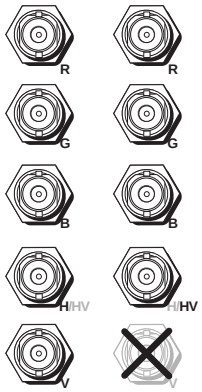


Balanced Input
(high impedance)

Step 6

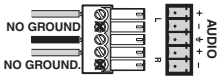
Connect RGB video displays to the Output 1 and Output 2 female BNC and 15-pin HD connectors. Connect the various video formats to the BNCs as shown.

NOTE *Both output connector types output the same video signal and the same sync format.*

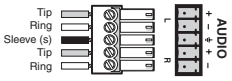


Step 7

Cable the switcher for audio output. Each output has a 3.5 mm, 5-pole captive screw connector that outputs the selected unamplified, line level audio. Connect an audio device, such as an audio amplifier or powered speakers.



Unbalanced Output

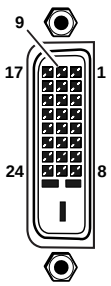


Balanced Output

CAUTION *Connect the sleeve to ground. Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.*

Step 8

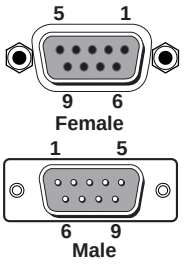
If the optional DVI output card is installed, connect a DVI video display to the output 1 DVI connector.



Step 9

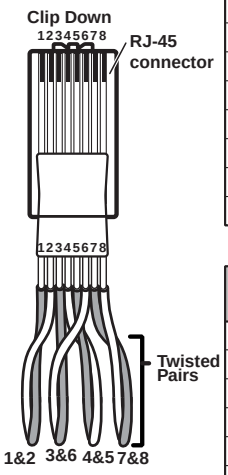
If desired, connect a control system or computer to the Remote RS-232 port.

Pin	RS-232	Function
1	—	Not used
2	TX	Transmit data
3	RX	Receive data
4	—	Not used
5	Gnd	Signal ground
6	—	Not used
7	—	Not used
8	—	Not used
9	—	Not used



Step 10

If desired, connect a network WAN or LAN hub, a control system, or computer to the Ethernet RJ-45 port. For connection to a network hub, router, or switch, wire the network interface cable as a straight-through cable. For connection to a computer or control system, wire the network interface cable as a crossover cable.



Straight-through cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Step 11

Plug the Integration Seamless Matrix switcher and input and output devices into a grounded AC source, and turn on the input and output devices.

Setup and Operation

Configure the inputs

1. Press **Menu** > **Next**.
2. Press an input button (to select the input to configure).
3. Rotate the Adjust ◂▸ knob to select the input video type.
4. Rotate the Adjust ▴▾ knob to select the input audio gain or attenuation level.
5. Select other inputs to configure as necessary by pressing the appropriate input button.
6. Press **Menu** > **Menu** > **Menu** > **Menu** > **Next** to return to the default display cycle.

Configure the outputs

1. Press **Menu** > **Menu** > **Next**.
2. Rotate the Adjust ◂▸ knob to select the output rate for the output indicated on the LCD (for example, output 1).
3. Rotate the Adjust ▴▾ knob to select the output frequency.
4. Configure the unselected output (for example, output 2) by pressing the appropriate output button and rotating the knobs as necessary.
5. Press **Next**.
6. Rotate the Adjust ◂▸ knob to select the output video sync format (RGBHV or RGBS).
7. Rotate the Adjust ▴▾ knob to select the sync polarity.
8. Configure the unselected output (for example, output 1) by pressing the appropriate output button and rotating the knobs as necessary.
9. Press **Menu** > **Menu** > **Menu** > **Next** to return to the default display cycle.

Create a tie

1. Select video and / or audio to switch by pressing the Video / Audio button as necessary to light the green Video LED and / or the red Audio LED as desired.
2. As necessary, press the Output 1 or Output 2 button to select the desired output. (Only one output can be selected at a time.) The Output LED indicates the selected output.
3. Press an input button to select a video and / or audio input for the selected output. The output 1 selection is indicated by the solid green (video) and / or red (audio) Input LED(s).
4. Press the unselected Output button to tie an input to that output or to view that tie. Both input selections can be viewed in the LCD display cycle.

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Chapter One

Introduction

About this Manual

About the Switcher

Features

Introduction

About this Manual

This manual contains installation, configuration, and operating information for the Extron ISM 482 Integration Scaling Matrix switcher.

In this manual, the terms “switcher” and “ISM” are used interchangeably to refer to the ISM 482.

- Chapter 1, “Introduction”, identifies the switcher’s features.
- Chapter 2, “Installation”, details how to install the switcher.
- Chapter 3, “Operation”, describes how to operate the switcher and use all of its features.
- Chapter 4, “Programer’s Guide”, provides information about programming and operating the switcher under RS-232 control, such as from a PC or host controller.
- Chapter 5, “Switcher Software”, details the Extron control software for Windows®, which allows you to configure and operate the switcher from a PC in a graphical environment.
- Chapter 6, “Ethernet Operation”, details configuration and operation of the switcher using an Ethernet browser.
- Chapter 7, “Maintenance and Modifications”, provides procedures for maintaining and modifying the switcher.
- Appendix A, “Ethernet Connection”, is a high-level Internet protocol (IP) primer (Ethernet and Telnet).
- Appendix B, “Reference Information”, lists the switcher’s specifications and pertinent part numbers.

About the Switcher

The ISM 482 is an eight-input, two-independently-scaled-output, video and stereo or mono audio matrix switcher. Figure 1-1 shows a typical ISM 482 application. The switchers accept high resolution RGB video, YUV (component) video, S-video (Y / C), and composite video inputs; scale the inputs; and output RGBHV or RGBS video and stereo audio. Triple-Action Switching™ (RGB delay) blanks the screen during the switch to prevent distracting video glitches. The switcher’s two independent scalers permit differing video formats on each input to be displayed in different resolutions on different projectors.

Each video input is individually configurable to allow for different video formats. The ISM allows analog RGBHV, RGBS, RGsB, and RGBcvS video, component video, S-video, and composite video signals to be displayed on a device with a fixed resolution and aspect ratio, such as a liquid crystal display (LCD) projector, digital light processor (DLP) projector, or plasma display.

The ISM provides two separate outputs. The selected input can be switched to either or both outputs. With an optional DVI output card, the ISM converts the scaled image to DVI as an additional set of output 1 signals.

The switcher inputs all valid video signal formats on eight sets of five BNC connectors. The ISM 482 scales the input up or down to a wide variety of output resolutions and rates. The switcher outputs the scaled video, as RGBHV or RGBS, on two sets of output connectors, consisting of five BNCs and a 15-pin HD connector. These connectors share identical outputs.

Several of the output resolutions and rates include Extron’s Accu-RATE Frame Lock™ (AFL™), a proprietary technology that locks the output frame rate to the input rate, solving the image tearing problem that can result from different input and output rates. The switcher features HDTV 576p, 720p, 1080p, and 1080i outputs.

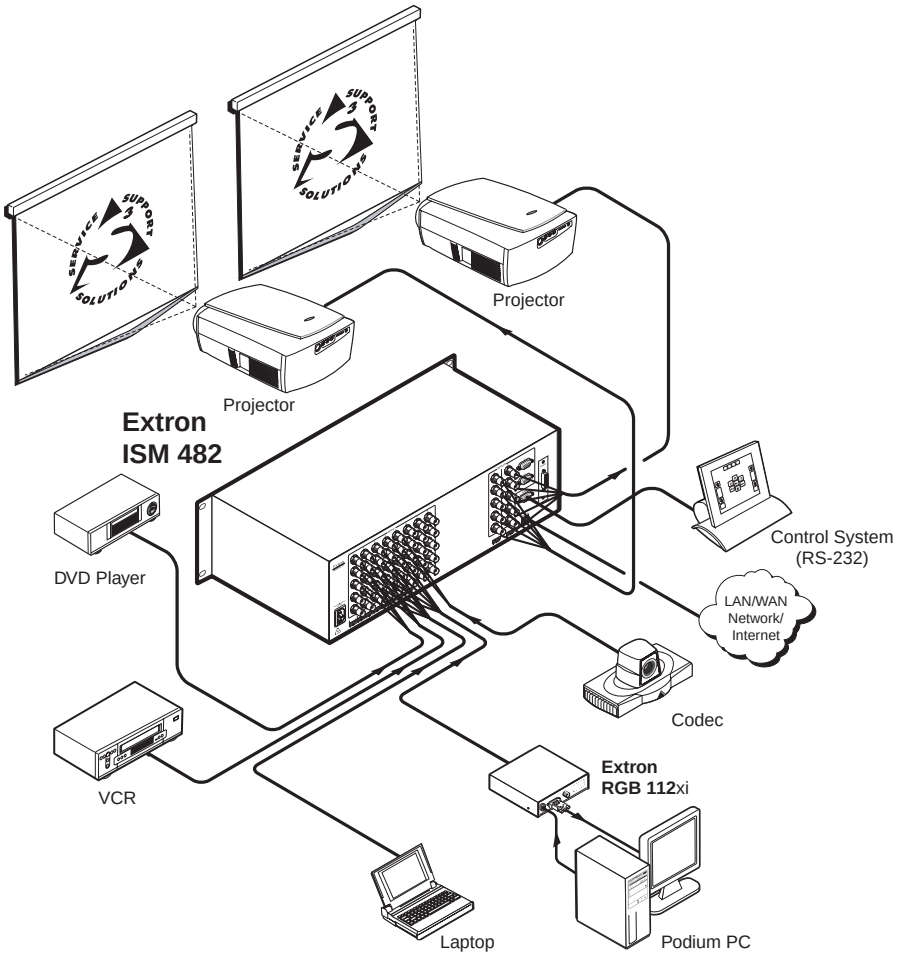


Figure 1-1— Typical ISM 482 Integration Scaling Matrix Switcher application

The ISM receives and outputs the stereo audio on 5-pole captive screw connectors.

For upscaling, the ISM 482 converts the horizontal and vertical sync timing and the number of lines of the lower-resolution video input to match the native resolution of the display. This produces an undistorted, brighter picture than an unscaled input would.

For downscaling, the ISM 482 accepts any computer resolution, up to 1600 x 1200, with horizontal scan rates up to 100 kHz and vertical scan rates up to 120 Hz, and converts the input to match the native resolution of the display.

The switcher is ideal for displaying images on projectors with limited display resolutions, such as LCD projectors, DLP projectors, and plasma projectors.

The switcher features built-in test patterns to aid in monitor or projector set-up and evaluation.

The switcher is housed in a rack-mountable, 3U high, 17.5" wide, metal enclosure. The ISM has an internal 100VAC to 240VAC, 50/60 Hz, 30 watts power supply that provides worldwide power compatibility.

Features

Inputs —

Video inputs — The ISM switches among eight fully-configurable RGB, HDTV component video, component video, S-video, and composite video inputs on five BNC connectors per input.

Audio inputs — The ISM switches among eight balanced or unbalanced stereo or mono audio inputs on 5-pole captive screw connectors.

Outputs —

Standard video outputs — The ISM outputs individually scaled video signals as RGBHV or RGBS. Two sets of BNC connectors and two 15-pin HD connectors are provided. One set of BNC connectors and one 15-pin HD connector display the output 1 image, and the other set of BNC connectors and 15-pin HD connector display the output 2 image.

Optional DVI video output — If you install the optional DVI output card, a single buffered DVI-D signal can be output as an additional output 1 image.

NOTE *For output resolutions with less than 1024 pixels horizontally, the optional DVI output's true horizontal resolution is limited to 1024 pixels. For the 1365 x 1024, 1080p, and 1080i output resolutions, the optional DVI output's true horizontal resolution is limited to 1280 pixels. The DVI card outputs all other selected resolutions normally. See the table on page 3-10.*

Audio outputs — The ISM outputs the selected unamplified, line level, balanced or unbalanced stereo or mono audio on 5-pole captive screw connectors.

Accu-RATE Frame Lock™ (AFL™) — A patented technology exclusive to Extron that solves frame rate conversion issues experienced by video scalers. When video input and output refresh rates differ, occasionally the two rates cross over each other. The result is a glitch or image freeze on the display. AFL solves this problem by locking the output frame rate to the input frame rate.

Dynamic Motion Interpolation™ (DMI™) — This video processing technique is an advanced motion prediction and compensation method that treats motion content and still content with different algorithms to yield high fidelity images.

3:2 pulldown detection for NTSC video sources and 2:2 film detection for PAL — These advanced, patent pending, film mode processing features help maximize image detail and sharpness for video sources that originated from film. When film is converted to NTSC video, the film frame rate has to be matched to the video frame rate in a process called 3:2 pulldown. Jaggies and other image artifacts can result if conventional deinterlacing techniques are used on film-source video. The ISM's advanced film mode processing recognizes signals that originated from film. The ISM then applies video processing algorithms that optimize the conversion of video that was made with the 3:2 pulldown process. This results in richly detailed images with sharply defined lines.

A similar process, 2:2 film detection, is used for PAL film-source video.

Audio follow and breakaway — Audio switching can follow its corresponding video input signal or it can be broken away from the video input. Audio breakaway switching can be done via front panel control or under RS-232 or Ethernet remote control.

Audio gain/attenuation — Users can set the input level of audio gain or attenuation (-24 dB to +9 dB) via the RS-232 port, Ethernet link, or from the front panel. Individual input audio levels can be adjusted so there is no noticeable volume difference between sources.

Ethernet port — Supports connection to an Ethernet LAN so that the switcher can be accessed and operated from anywhere in the world with a computer using a standard Internet browser.

Quad-standard video decoder — The switcher uses a digital, four-line adaptive comb filter that can decode NTSC 3.58, NTSC 4.43, PAL, and SECAM.

Test patterns — The switcher features built-in test patterns to aid in monitor or projector setup and evaluation.

Blue mode — The switcher can be set to output the blue video signal and sync signal(s) only, to help installers calibrate the monitor or projector.

Triple-Action Switching™ (RGB delay) — RGB delay mutes the R, G, and B video planes to blank the screen while the scaler locks to the new sync, so that a noise-filled scramble is not shown on the monitor during the transition. The time delay between the RGB and sync signals is user adjustable up to five seconds under front panel, Simple Instruction Set (SIS™), and Windows program control.

Auto memories — The eight inputs support 16 auto-recall memories each, based on the incoming frequency. Information on sizing, centering, detail, contrast, and brightness is saved.

Auto Image™ — The auto imaging feature automatically sizes and centers the selected input to fill the screen. Auto imaging can be selected for individual inputs as desired or set to automatically size and center each new input selection.

Memory presets — The ISM 482 has memory for up to 128 presets that allow the user to use RS-232 commands to save and recall color, tint, contrast, brightness, centering, sizing, and filtering information.

Aspect ratio memories — Three memories for each input save different color, tint, contrast, brightness, detail, size, and centering settings.

Freeze mode (under SIS and Windows program control only) — Locks the output display to the selected image. Once frozen, an input can be removed without losing the output image. This feature lets the ISM store a still image.

Rack mounting — The 3U high switcher can be mounted in any conventional 19" wide rack.

2

Chapter Two

Installation

Mounting the Switcher

Cabling and Rear Panel Views

Configuration

Installation

Mounting the Switcher

Four uninstalled rubber feet are included with the switcher. If you are going to rack mount the switcher, mount it before you cable it (see "Rack mounting", below), and do not install the rubber feet. If you are not rack mounting the switcher, see "Tabletop placement" below.

Tabletop placement

For tabletop placement, install the self-adhesive rubber feet / pads (provided) onto the four corners of the bottom of the switcher.

Rack mounting

UL requirements

The following Underwriters Laboratories (UL) requirements pertain to the installation of the switcher into a rack (figure 2-1).

1. **Elevated operating ambient temperature** — If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the switcher in an environment compatible with the maximum ambient temperature (Tma = +122 °F, +50 °C) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Mounting instructions

To rack mount the switcher, use two screws on each end of the switcher to attach the switcher to the rack (see figure 2-1).

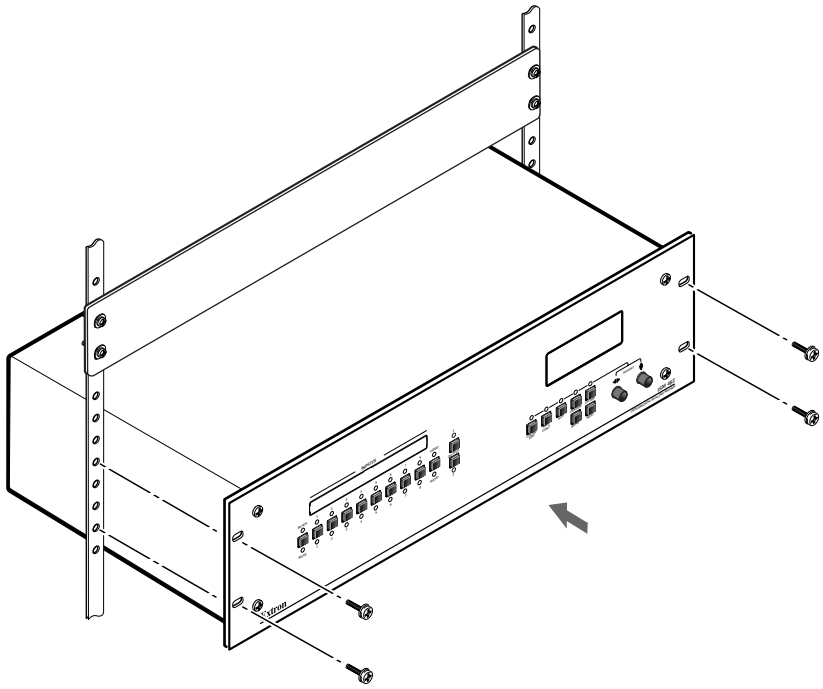


Figure 2-1 — Mounting the switcher

Cabling and Rear Panel Views

All connectors are on the rear panel (figure 2-2).

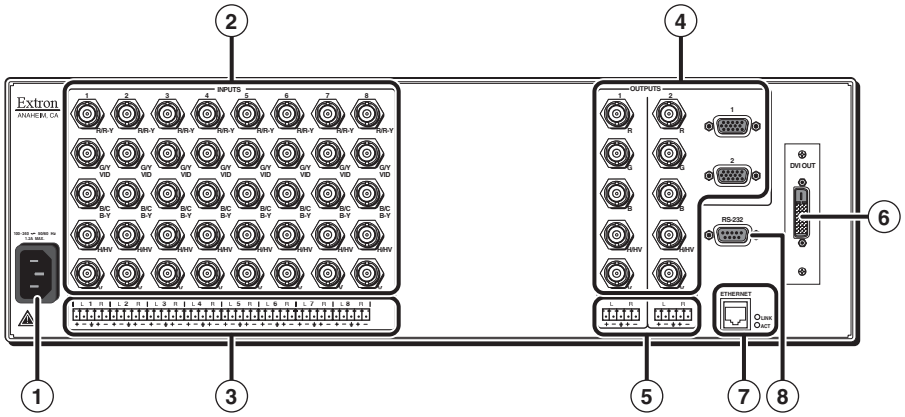


Figure 2-2 — ISM 482 rear panel connectors

Input connections

1. **AC power connector —** Plug a standard IEC power cord into this connector to connect the switcher to a 100 to 240 VAC, 50 Hz or 60 Hz power source.

2. **Input video connectors —** Connect computer or RGB video, component video, S-video, or composite video sources to these female BNC connectors. Figure 2-3 shows how to connect the various video formats.

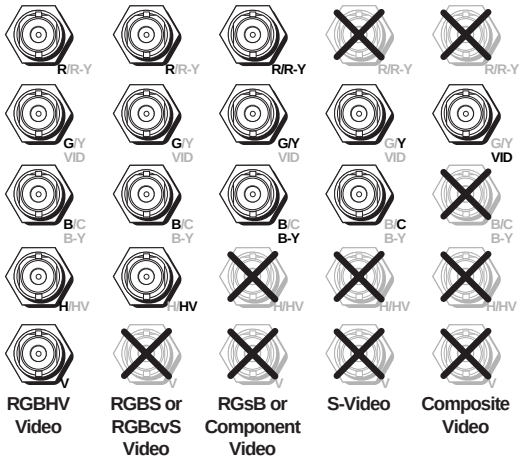


Figure 2-3 — Connections for various input video formats

③ **Input audio connectors —** Connect balanced or unbalanced stereo or mono audio sources to these 3.5 mm, 5-pole captive screw connectors. Connectors are included with the seamless switcher, but you must supply the audio cable. Figure 2-4 shows how to wire a connector for the appropriate input type. High impedance is generally over 800 ohms.

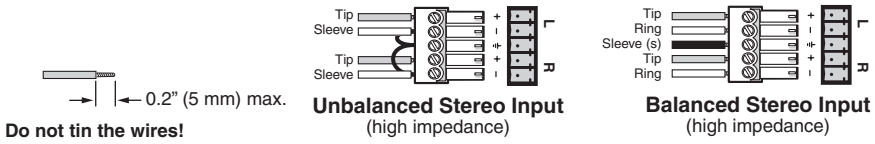


Figure 2-4 — Captive screw connector wiring for inputs

CAUTION *The length of exposed wires is critical. The ideal length is 0.2" (5 mm).*

- *If the stripped section of wire is longer than 0.2", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 0.2", wires can be easily pulled out even if tightly fastened by the captive screws.*

NOTE *When making connections for the seamless switcher from existing audio cables, see figure 2-5. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. The tip, ring, and sleeve wires are also shown on the captive screw audio connector diagram, figure 2-4.*

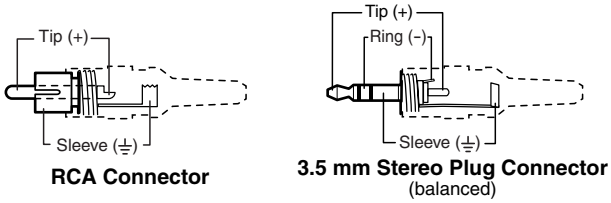


Figure 2-5 — Phono audio connectors

The audio level for each input can be individually set, via the front panel, the Ethernet link, or the RS-232 link, to ensure that the level on the output does not vary from input to input. See chapter 3, “Operation”, chapter 4, “Programmer’s Guide”, chapter 5, “Switcher Software”, and chapter 6, “Ethernet Operation”, for details.

Standard output connections

NOTE *The two Output 1 outputs, consisting of five BNC connectors and a 15-pin HD connector, output the identical video signal and the same sync format. The two Output 2 outputs are also identical to each other.*

④ **Video output BNC connectors —** Connect RGB video displays to these two sets of female BNC connectors. Figure 2-6 shows how to connect the various video formats.

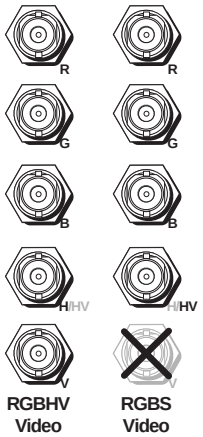


Figure 2-6 — BNC output connections for RGBHV and RGBS video

Video output 15-pin HD connectors — Connect RGB video displays to these two female 15-pin HD connectors.

⑤ **Audio output connectors —** Connect audio devices, such as an audio amplifier or powered speakers, to these two 3.5 mm, 5-pole captive screw connectors. The connectors output the selected unamplified, line level audio. See figure 2-7 to properly wire an output connector.

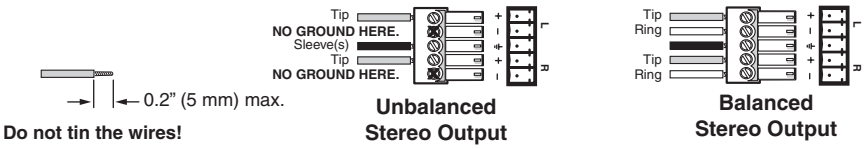


Figure 2-7 — Captive screw connector wiring for audio output

CAUTION *Connect the sleeve to ground (Gnd). Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.*

CAUTION *The length of exposed wires is critical. The ideal length is 0.2" (5 mm).*

- *If the stripped section of wire is longer than 0.2", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 0.2", wires can be easily pulled out even if tightly fastened by the captive screws.*

By default, the audio output follows the video switch. Audio breakaway, commanded via the front panel, the Ethernet link, or the RS-232 link, allows you to select from any one of the audio input sources. See chapter 3, "Operation", chapter 4, "Programmer's Guide", chapter 5, "Switcher Software", and chapter 6, "Ethernet Operation" for details.

Optional output connection

⑥ **DVI output connector (optional) —** If the optional DVI output card is installed, connect a DVI/DFP-compatible video display to this DVI connector. This connector outputs the image selected for output 1 only.

NOTE *For output resolutions with less than 1024 pixels horizontally, the optional DVI output's true horizontal resolution is limited to 1024 pixels. For the 1365 x 1024, 1080p, and 1080i output resolutions, the optional DVI output's true horizontal resolution is limited to 1280 pixels. The DVI card outputs all other selected resolutions normally. See the table on page 3-10.*

Ethernet connection

⑦ **Ethernet port —** If desired, connect the switcher to an Ethernet LAN or WAN via this RJ-45 connector. Ethernet control allows the operator to control the switcher from a remote location. When connected to an Ethernet LAN or WAN, the switcher can be accessed and operated from a computer running a standard Internet browser.

Ethernet connection indicators — The Link and Act LEDs indicate the status of the Ethernet connection.

The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily.

The Act LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

Cabling and RJ-45 connector wiring

It is vital that your Ethernet cables be the correct cables, and that they be properly terminated with the correct pinout.

Choosing a network cable

Ethernet links use Category (CAT) 3, 4, 5, 5e, or 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to 328' (100 m).

NOTE *Do not use standard telephone cables. Telephone cables will not support Ethernet or Fast Ethernet.*

Do not stretch or bend cables. Transmission errors can occur.

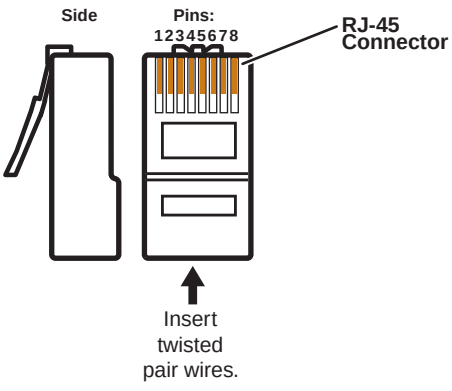
The cable used depends on your network speed. The ISM supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex, Ethernet connections.

- 10Base-T Ethernet requires, at a minimum, CAT 3 UTP or STP cable.
- 100Base-T Fast Ethernet requires, at a minimum, CAT 5 UTP or STP cable.

Wiring the network cable

The cable can be terminated as either a patch cable or a crossover cable (figure 2-8) and must be properly terminated for your application:

- **Patch (straight) cable** — Connection of the ISM to an Ethernet hub, router, or switcher that also hosts a controlling computer
- **Crossover cable** — Direct connection between the ISM and a controlling computer



Patch (straight) cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Figure 2-8 — RJ-45 connector pinout tables

RS-232 connection

⑦ **Remote port —** Connect a host device, such as a computer or touch panel control, to the integration scaling matrix switcher via this 9-pin D connector for serial RS-232 control (figure 2-9).

Pin	RS-232	Function
1	—	Not used
2	TX	Transmit data
3	RX	Receive data
4	—	Not used
5	Gnd	Signal ground
6	—	Not used
7	—	Not used
8	—	Not used
9	—	Not used

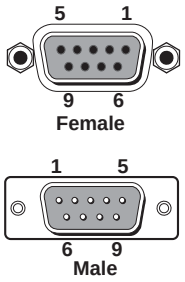


Figure 2-9 — Remote port pin assignments

See chapter 4, “Programmer’s Guide”, for definitions of the SIS commands and chapter 5, “Switcher Software” to install and use the control software.

Configuration

The ISM can be configured using either the front panel controls, the SIS, or the Windows Control program. See chapter 3, “Operation”, chapter 4, “Programmer’s Guide”, and chapter 5, “Switcher Software”.

3

Chapter Three

Operation

Front Panel Controls and Indicators

Front Panel Operations

Optimizing the Video

Optimizing the Audio

Troubleshooting

Operation

Front Panel Controls and Indicators

All of the switcher's controls and indicators are on the front panel (figure 3-1). A label window above the input buttons can be labeled with text and / or graphics. The 20 x 4 LCD display indicates the switcher status, menu selections, the data rate, and the status of additional system features.

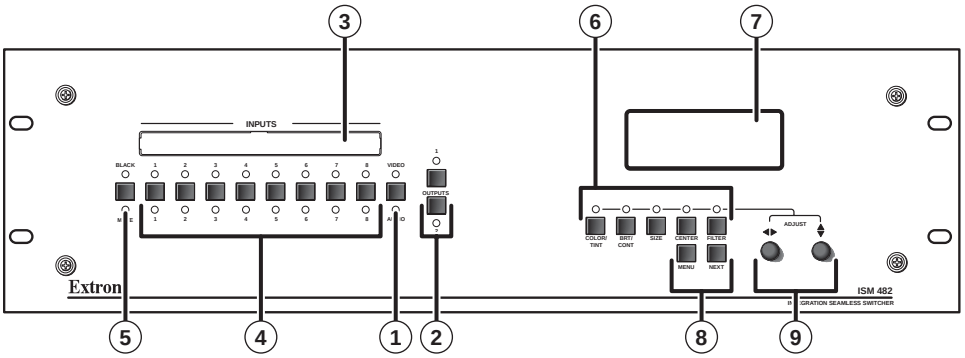


Figure 3-1 — Integration Scaling Matrix Switcher front panel

Video/Audio selection button and LEDs

(1) **Video/Audio button —** The Video / Audio button selects video, audio, or video and audio for creating ties. If neither is selected, no ties can be created.

Video and Audio LEDs — The green Video LED and red Audio LED indicate whether video, audio, video and audio, or neither will be selected using the Input buttons and indicated by the Input LEDs (④).

Figure 3-2 shows the sequence displayed by the LEDs when you cycle through video and / or audio selection by pressing the Video / Audio button repeatedly as follows.

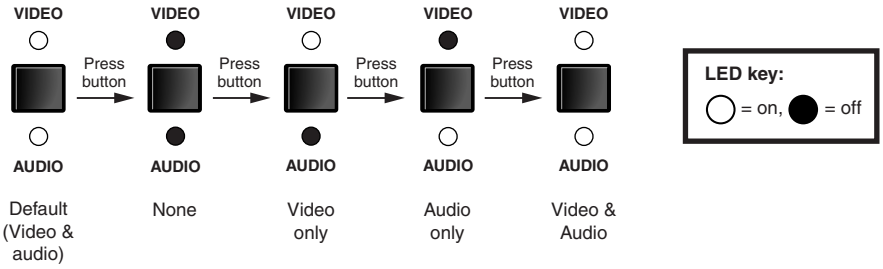


Figure 3-2 — Video and/or audio selection cycle

Output buttons and LEDs

(2) **Output 1 and Output 2 buttons —** The Output 1 and Output 2 buttons select output 1 or output 2. Press an output button to select that output and automatically deselect the other output (figure 3-3).

Output 1 and 2 LEDs — The Output 1 and Output 2 LEDs indicate the output that is selected (figure 3-3). Only one Output LED can be lit at a time.

NOTE *Only one of the two outputs can be selected at a time.*

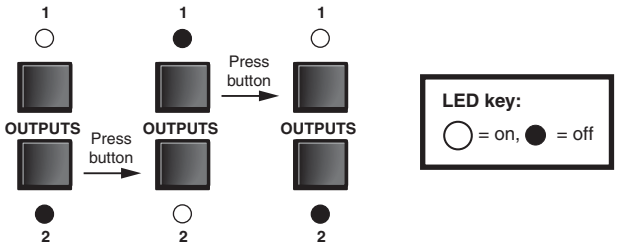


Figure 3-3 — Output selection cycle

When an output is selected, its tied input is indicated by the associated Input LED. You can select a different input to tie to this output by pressing the desired input button.

Input buttons, LEDs, and label window

Front panel input label window

(3) **Input label panel —** This translucent panel can be removed and replaced to insert a label behind the panel. To remove the panel, insert the Phillips-head end of an Extron tweeker or small Phillips-head screwdriver into the hole in one end of the panel, and gently slide the tab on the edge of the panel out of the recess in the switcher housing.

Input labels can be created easily with Extron's button label generator software, which is shipped with every Extron Matrix Switcher, or with any Brother® P-Touch™ labeler. Each input can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection (figure 3-4). See chapter 5, "Switcher Software", for details on using the label software.

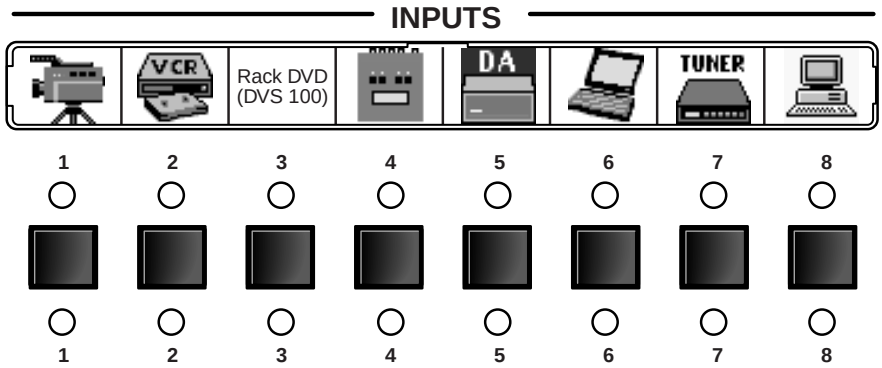


Figure 3-4 — Sample label

Selecting an input

④ **Input selection buttons —** The Input 1 through Input 8 buttons select the associated input to scale and display on the selected output(s).

Input selection LEDs — The green input LEDs above the input buttons indicate the video selection. The red input LEDs below the input buttons indicate the audio selection. To view the input tied to the unselected output, press the unselected output button. Both outputs' input selections can also be viewed in the LCD display cycle.

Recalling a user preset

There are three user presets per input. The presets save color, tint, contrast, brightness, detail, sizing, and centering settings. See "User Presets menu" later in this chapter to save and erase presets. Cycle through and recall these memories by repeatedly pressing the appropriate input button. The LCD panel identifies the recalled preset (figure 3-5).

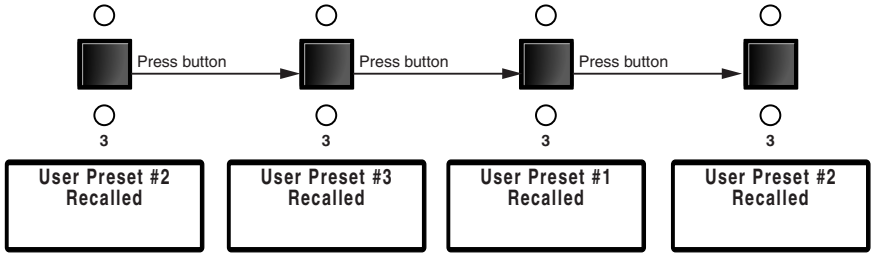


Figure 3-5 — Recalling user presets

Auto imaging an input

The auto imaging feature automatically sizes and centers the selected input to fill the screen. Initiate the auto imaging feature for a specific input by pressing and **holding** the appropriate input button until the LCD displays the message **Auto Image Input #*n***, releasing the input button, and then pressing and releasing the input button again. The LCD displays **AutoSizing and Centering Please Wait...** until the operation is complete.

Alternatively, using the menu system, you can set this feature to apply the Auto Image adjustments to every input as it is selected (see "Auto Imaging and Auto Memories submenu", later in this chapter).

Black/Mute button and LEDs

⑤ **Black/Mute button and LEDs —** The Black / Mute button switches the selected output(s) to a black screen and / or muted audio. The black screen and / or mute audio is deselected when a new input is selected.

Picture adjustment buttons

⑥ The picture adjustment buttons select individual image adjustments that are adjusted using the Adjust ◂▸ and Adjust ▴▾ knobs (⑨). The LEDs above these buttons light when the button is pressed. See "Picture adjustments" later in this chapter.

Color/Tint control button — The Color / Tint button selects the display color and tint adjustments. The color adjustment range is from 0 to 127. The tint adjustment range is from 0 to 255.

NOTE *The Color/Tint control affects only composite video and S-video inputs.*

Brightness/Contrast control button — The Brightness / Contrast button selects the display brightness and contrast adjustments. The adjustment range for both brightness and contrast is from 0 to 63.

Size control button — The Size button selects the display size adjustment. The adjustment range depends on the output resolution selected.

Center control button — The Center button selects the display centering adjustment. The adjustment range depends on the output resolution selected.

Filter control (Detail) button — The Detail button selects the display image detail (sharpness) adjustment. There are separate horizontal and vertical filters for RGB and component video. There is a single filter for S-video and composite video. The sharpness adjustment compensates for long cable runs.

- **For RGB and component video**, the Adjust ◂▸ knob controls the horizontal filter and the Adjust ▴▾ knob controls the vertical filter. The adjustment range for the horizontal filter is from 0 to 3. The adjustment range for the vertical filter is from 0 to 7.
- **For S-video and composite video**, either Adjust knob controls the filter setting. The range of the adjustment is from 0 to 7.

LCD display

⑦ **Status display —** The 20-column by 4-line LCD displays configuration menus and status information. See “Front Panel Operations”, later in this chapter, for details.

Menu control buttons

⑧ **Menu button —** The Menu button enters and moves through the main menu system in the ISM. See “Front Panel Operations”, later in this chapter, for details.

Next button — The Next button steps through the submenus in the ISM menu system. See “Front Panel Operations”, later in this chapter, for details.

Adjustment knobs

⑨ **Adjust ◂▸ (horizontal) and Adjust ▴▾ (vertical) knobs —** The Adjust ◂▸ and Adjust ▴▾ knobs change settings when used in conjunction with the picture adjustment buttons or the menu system. Rotate these knobs to change picture settings when one of the picture adjustment buttons is selected. In the menu system, rotate these knobs to scroll through the selection options and make adjustments.

Front Panel Operations

The following paragraphs detail the power-up process and then describe the menu system, the picture adjustments, and selection of executive mode.

Power

Power is automatically applied when the power cord is connected to an AC source. When AC power is applied, the switcher performs a self-test that blinks all of the front panel LEDs and then lights only the LEDs for the previously selected output and the tied input. The self-test also displays the model name, part number, and the firmware version in the LCD display. After approximately 2 seconds, the LCD reverts to its default display cycle, alternating between two displays: one showing the inputs selected for outputs 1 and output 2, and the other showing the selected output rates (figure 3-6). An error-free power up self-test sequence leaves all of the LEDs off, with the exception of the selected output's and input's LEDs, off and the LCD cycling through the default displays.

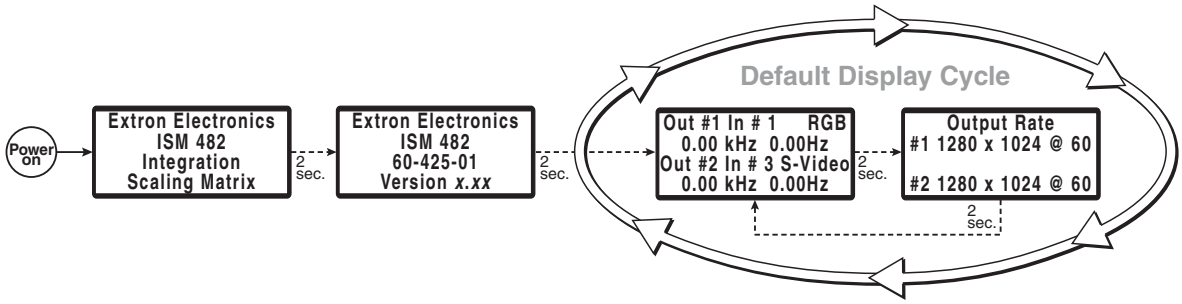


Figure 3-6 — LCD power up and default display cycle

The selected inputs for output 1 and output 2, the picture adjustments, and other current settings are saved in nonvolatile memory. When power is applied, the latest configuration is retrieved.

NOTE *On figure 3-6 and all other flowcharts in this chapter, solid lines indicate screen changes initiated by the operator. Dashed lines indicate screen changes that are the result of a timeout function.*

Menu system overview

Figure 3-7 shows a flowchart of the main menus in the menu system.

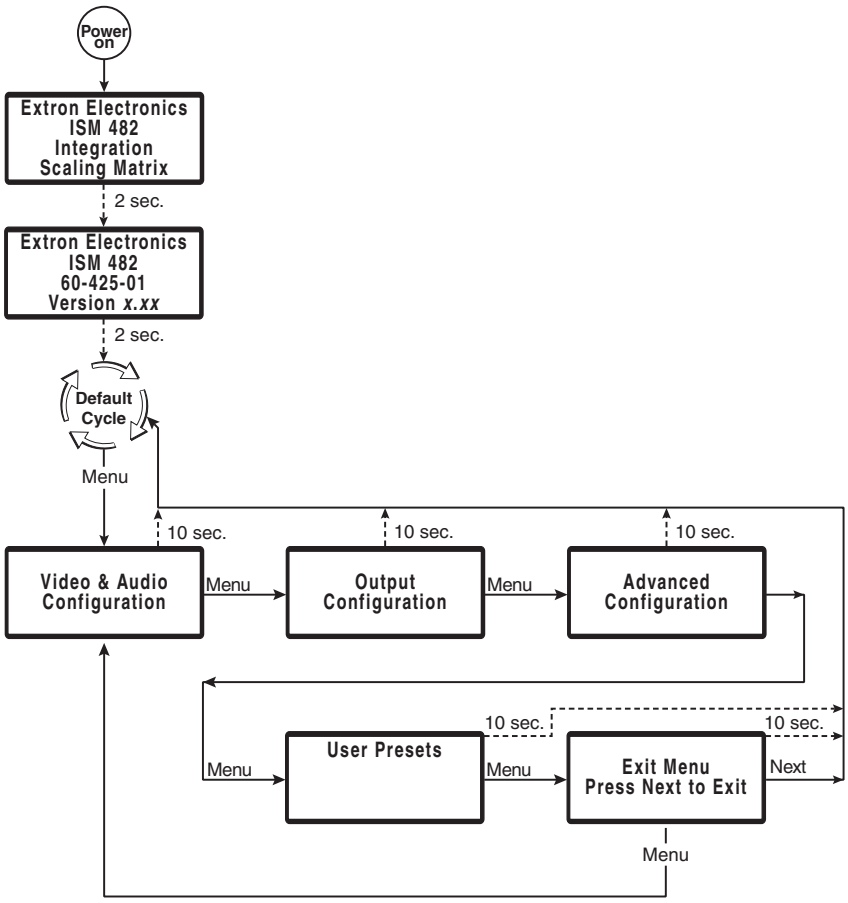


Figure 3-7 — Menu system flowchart

Menu button — Press the Menu button to activate the menu system and to scroll through the five main menus.

Next button — Press the Next button to move between the submenus of a selected main menu, to activate one for viewing or configuration, and to save a selection. Pressing the Next button during input configuration causes the current input's number and format type to be displayed on the LCD.

Adjust ◂▸ and Adjust ▴▾ knobs — When a submenu is active, rotate the Adjust ◂▸ knob and Adjust ▴▾ knob to scroll through the submenu options and select a setting. Refer to the flowcharts in this chapter and to specific sections for explanations on knob adjustments.

NOTE *If you press the Menu button while a main menu or a submenu is active, the next main menu becomes active. For example, the display changes from the Video & Audio Configuration main menu or the Input Configuration submenu (a submenu of the Video & Audio Configuration menu) to the Output Configuration main menu.*

NOTE *To return to the default screens, let the switcher remain idle for 10 seconds until the selected screen times out; or press the Menu button until the Exit Menu appears, then press the Next button.*

NOTE *From any menu or submenu, after 10 seconds of inactivity, the ISM saves all adjustment settings and times out to the default LCD display cycle.*

Video & Audio Configuration menu

Figure 3-8 is a flowchart that shows an overview of the Video & Audio Configuration menu and the available settings.

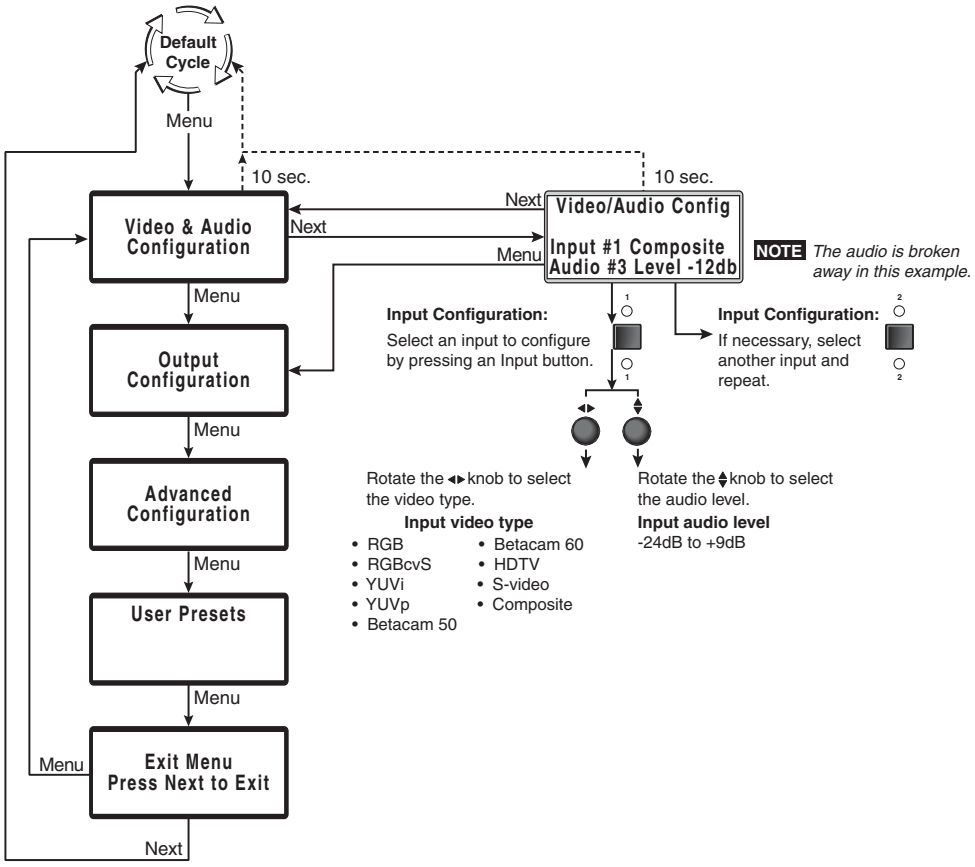


Figure 3-8 — Video and Audio Configuration menu flowchart

Input Configuration submenu

Select an input to configure by pressing and releasing an input button. Rotate the Adjust ◂▸ knob while in the Input Configuration submenu to select the correct video format (RGB, RGBcvS, YUVi, YUVp, Betacam 50, Betacam 60, HDTV, S-video, or composite video) for the selected input. Rotate the Adjust ▴▾ knob to select the audio gain or attenuation value, from -24 dB to +9 dB. The defaults for each input are RGB video and a 0 dB audio level.

Output Configuration menu

Figure 3-9 is a flowchart that shows an overview of the Output Configuration menu, the submenus, and the available settings.

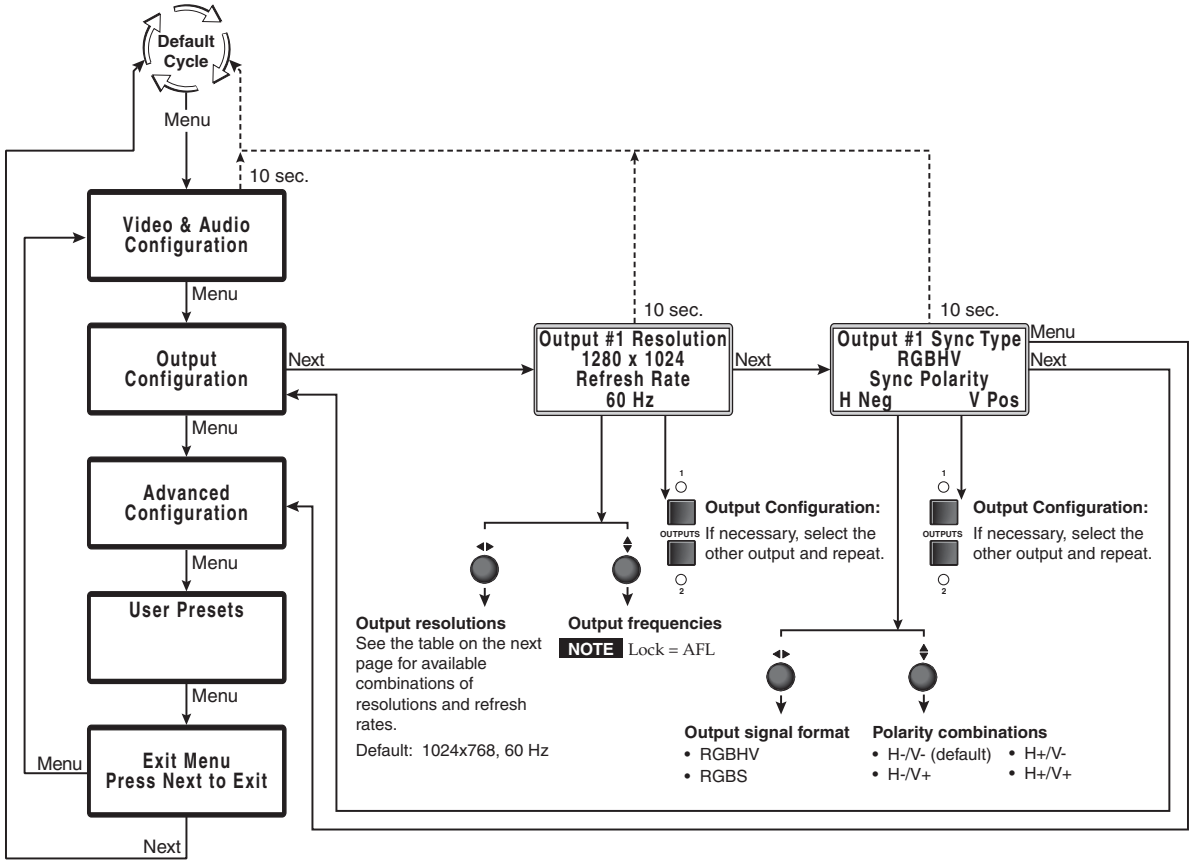


Figure 3-9 — Output Configuration menu flowchart

Output Resolution submenu

Select the output whose resolution and refresh rate you want to set by pressing the desired Output button.

Rotate the Adjust ◂▸ knob while this submenu is active to select one of the available output resolutions.

Rotate the Adjust ▴▾ knob while this submenu is active to select one of the available refresh (vertical scanning) rates. Selecting Lock enables the Extron Accu-RATE Frame Lock (AFL) feature. Accu-RATE Frame Lock eliminates image tearing and other artifacts of scaling motion video by eliminating frame rate conversion. It exactly matches the output rate of the ISM to the frame rate of input 1. Select this feature if you will be using motion video sources with a display that is capable of a variety of refresh rates. AFL is compatible with 50 Hz and 60 Hz only.

The default resolution and rate is 1024 x 768 @ 60 Hz.

If you need to set the resolution and refresh rate on the other output, press the other output button. You do not need to exit this submenu.

Resolution	50 Hz	56 Hz	60 Hz	75 Hz	85 Hz	Lock at 50/60 Hz†	Actual DVI output
640 x 480	●		●	●		●	1024 x 480
800 x 600	●		●	●		●	1024 x 600
832 x 624			●	●		●	1024 x 624
848 x 480			●			●	1024 x 480
852 x 480			●			●	1024 x 480
1024 x 768*	●		●	●	●	●	1024 x 768
1280 x 768*		●				●	1280 x 768
1280 x 1024*	●		●				1280 x 1024
1360 x 765*			●			●	1360 x 765
1365 x 768*	●		●			●	1365 x 768
1365 x 1024			●			●	1280 x 1024
1366 x 768*			●			●	1366 x 768
1400 x 1050*	●		●			●	1400 x 1050
576p HDTV*	●					●	720 x 576
720p* HDTV @ 60 Hz only			●			●	1280 x 720
1080p HDTV @ 60 Hz only			●			●	1280 x 1080
1080i HDTV	●		●			●	1280 x 540

* *Native DVI output resolution*

† *The output refresh rate is auto-selected, based on the video refresh rate of input 1.*

NOTE

- *For output resolutions with less than 1024 pixels horizontally, the optional DVI output's true horizontal resolution is limited to 1024 pixels. The vertical resolution is the selected vertical resolution. For these resolutions, the ISM DVI output is 1024 x {selected vertical size}. For example, if the output resolution is set to 640 x 480, the DVI output card's actual resolution is 1024 × 480.*
- *For the 1365 x 1024, 1080p, and 1080i output resolutions, the optional DVI output's true horizontal resolution is limited to 1280 pixels. For these resolutions, the ISM DVI output is 1280 x {selected vertical size}. For example, if the output resolution is set to 1080p, the DVI output card's actual resolution is 1280 x 1080.*
- *The DVI card outputs all other selected resolutions normally.*
- *Resolutions marked with an asterisk (*) in the table above are native DVI outputs, meaning that the DVI output fully supports the selected horizontal and vertical resolution. The DVI output resolution for these rates exactly matches the analog resolution.*

Sync Type and Polarity submenu

Select the output whose sync type and polarity you want to set by pressing the desired Output button.

Rotate the Adjust ◂▸ knob while in this submenu to select the output video type (RGBHV or RGBS) for the selected output.

The display or projector may require a particular combination of horizontal (H) and vertical (V) sync signal polarities. Select the appropriate combination of positive or negative H and V sync for the selected output by rotating the Adjust ⇕ knob.

If you need to set the sync type and polarity on the other output, press the other output button. You do not need to exit this submenu.

Advanced Configuration menu

Figure 3-10 is a flowchart that shows an overview of the Advanced Configuration menu, the submenus, and the available settings.

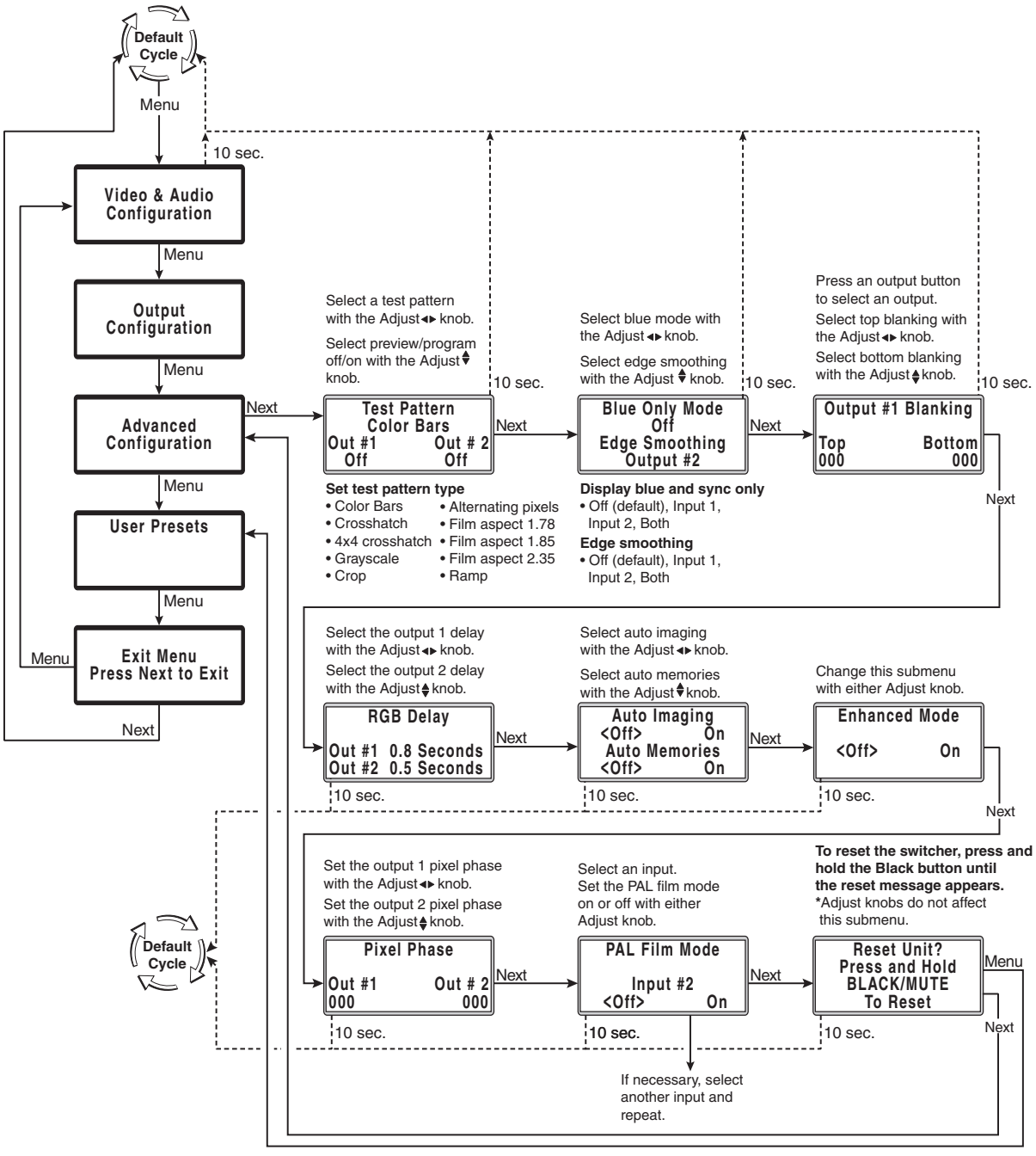

Default Cycle
Menu
10 sec.
Video & Audio Configuration
Output Configuration
Advanced Configuration
User Presets
Exit Menu
Press Next to Exit
Next
Select a test pattern with the Adjust ◂▸ knob.
Select preview/program off/on with the Adjust ⇕ knob.
Test Pattern
Color Bars
Out #1 Off
Out # 2 Off
Set test pattern type
• Color Bars
• Crosshatch
• 4x4 crosshatch
• Grayscale
• Crop
• Alternating pixels
• Film aspect 1.78
• Film aspect 1.85
• Film aspect 2.35
• Ramp
Select blue mode with the Adjust ◂▸ knob.
Select edge smoothing with the Adjust ⇕ knob.
Blue Only Mode
Off
Edge Smoothing
Output #2
Display blue and sync only
• Off (default), Input 1, Input 2, Both
Edge smoothing
• Off (default), Input 1, Input 2, Both
Press an output button to select an output.
Select top blanking with the Adjust ◂▸ knob.
Select bottom blanking with the Adjust ⇕ knob.
Output #1 Blanking
Top 000
Bottom 000
Select the output 1 delay with the Adjust ◂▸ knob.
Select the output 2 delay with the Adjust ⇕ knob.
RGB Delay
Out #1 0.8 Seconds
Out #2 0.5 Seconds
Select auto imaging with the Adjust ◂▸ knob.
Select auto memories with the Adjust ⇕ knob.
Auto Imaging
<Off> On
Auto Memories
<Off> On
Change this submenu with either Adjust knob.
Enhanced Mode
<Off> On
Set the output 1 pixel phase with the Adjust ◂▸ knob.
Set the output 2 pixel phase with the Adjust ⇕ knob.
Pixel Phase
Out #1 000
Out # 2 000
Select an input.
Set the PAL film mode on or off with either Adjust knob.
PAL Film Mode
Input #2
<Off> On
If necessary, select another input and repeat.
To reset the switcher, press and hold the Black button until the reset message appears.
*Adjust knobs do not affect this submenu.
Reset Unit?
Press and Hold
BLACK/MUTE
To Reset
10 sec.

Figure 3-10 — Advanced Configuration menu flowchart

Test Pattern submenu

The Test Pattern submenu lets you select from among several test patterns and assign the selected pattern to an output. The test patterns are helpful when adjusting the connected displays for color, convergence, focus, resolution, contrast, grayscale, and aspect ratio.

Use the Adjust ◂▸ knob to select a test pattern. The options are: Color Bars, crosshatch, 4 x 4 crosshatch, grayscale, crop, alternating pixels, film aspect ratios 1.78, 1.85, 2.35, and ramp.

Use the Adjust ▴▾ knob to assign the output(s) for the selected test pattern. Select among neither output (both off), output 2, output 1, or both outputs.

Blue-Only Mode and Edge Smoothing submenu

The Blue-Only Mode and Edge Smoothing submenu lets you turn the blue mode and edge smoothing features on and off. Blue-only mode is helpful in the setup of the color and tint of the incoming video signal. In the blue-only mode, only the sync and blue video signals are passed to the display. Edge enhancement mode smooths edges of a picture by minimizing the differences between pixels.

Use the Adjust ◂▸ knob to assign Blue-Only Mode to neither output (both off), output 2, output 1, or both outputs. The default is Off.

Use the Adjust ▴▾ knob to assign Edge Smoothing to neither output (both off), output 2, output 1, or both outputs. The default is Off.

Blanking submenu

The Output Blanking submenu displays and allows you to adjust the top and bottom line blanking on the output monitors within a range of 0 to 200 lines. During scaling, captioning and tapehead switching in the video's blanking area may show up as picture noise. Using blanking, you can add black lines at the top and bottom edges of the image to eliminate edge noise.

Select the output that you want to blank by pressing the desired Output button.

Use the Adjust ◂▸ knob to increase or decrease the top line blanking. The default is 0 lines.

Use the Adjust ▴▾ knob to increase or decrease the bottom line blanking. The default is 0 lines.

RGB Delay submenu

The RGB Delay submenu displays and lets you set the RGB delay when a switch is made. With RGB delay, sync is never removed from the display. Rather, the ISM blanks the RGB (video) outputs while the scaler locks to the new sync, and then switches the RGB signals. This allows a brief delay for the displays to adjust to the new sync timing before displaying the new picture, which appears without glitches. RGB delay is also known as Triple-Action Switching™ or video mute switching.

Use the Adjust ◂▸ knob to select the blanking period (RGB delay time) for output 1 from 0 seconds to 5 seconds in 0.1 second steps. The default is 0.2 seconds.

Use the Adjust ▴▾ knob to select the blanking period for output 2.

Auto Imaging and Auto Memories submenu

The Auto Imaging and Auto Memories submenu provides a means to turn the auto imaging and auto presets features on or off for all input selections.

If auto imaging is set to on, the ISM automatically sizes and centers the selected input to fill the screen when a new frequency is input. If auto imaging is set to off, the ISM sizes and centers the selected input only when it is commanded using the input button. See "Auto imaging an input", earlier in this chapter. Rotate the Adjust ◂▸ knob to toggle auto imaging on or off for all input selections.

The auto memories feature saves and recalls centering and sizing information, based on the input frequency. With some control systems, the delay involved in recalling the memory can be a problem, so it may improve system performance to turn auto memories off. Rotate the Adjust ▴▾ knob to toggle auto memories on or off.

Enhanced Mode submenu

The Enhanced Mode submenu provides a means to turn enhanced mode on or off. Enhanced mode is an automatic gain control for S-video or composite video input signals scaled and applied to an output. If the input signal level is too weak, the signal gain is increased; if the input signal level is strong, the signal gain is decreased.

Use either the Adjust ◂▸ or Adjust ▴▾ knob to turn on enhanced mode for neither output (off for both), output 2, output 1, or both outputs. The default is Off for both.

NOTE *Enhanced mode is effective only for S-video and composite video input signals.*

Pixel Phase submenu

The Pixel Phase submenu displays and lets you set the pixel phase, which is the timing of the digital scaler's sampling. Sampling at the optimum pixel phase results in a brighter scaled output.

Use the Adjust ◂▸ knob to select the pixel phase for output 1 from 0 to 31. The default is 16.

Use the Adjust ▴▾ knob to select the pixel phase for output 2.

PAL Film Mode submenu

The PAL Film Mode submenu lets you turn PAL film mode on and off for the selected input. The PAL film mode should be used for a video source that is PAL video that originated from film. PAL film mode applies video processing algorithms that optimize the conversion of video that was made with the 2:2 pulldown (PAL video from film) process.

Use either the Adjust ◂▸ knob or the Adjust ▴▾ knob to select On or Off. Select other inputs as necessary to configure.

Reset submenu

The Reset submenu resets all ISM 482 settings and adjustments to the default values and erases all presets. The front panel reset performs the same functions as the Esc zXXX← SIS command (see chapter 4, "Programmer's Guide").

Reset the switcher by pressing and **holding** the Black / Mute button while this submenu is active. The LCD displays **Unit Reset to Factory Defaults** when the reset is complete. Release the Black / Mute button.

User Presets menu

Figure 3-11 is a flowchart that shows an overview of the User Presets menu, the Save Preset and Erase Preset submenus, and the available settings.

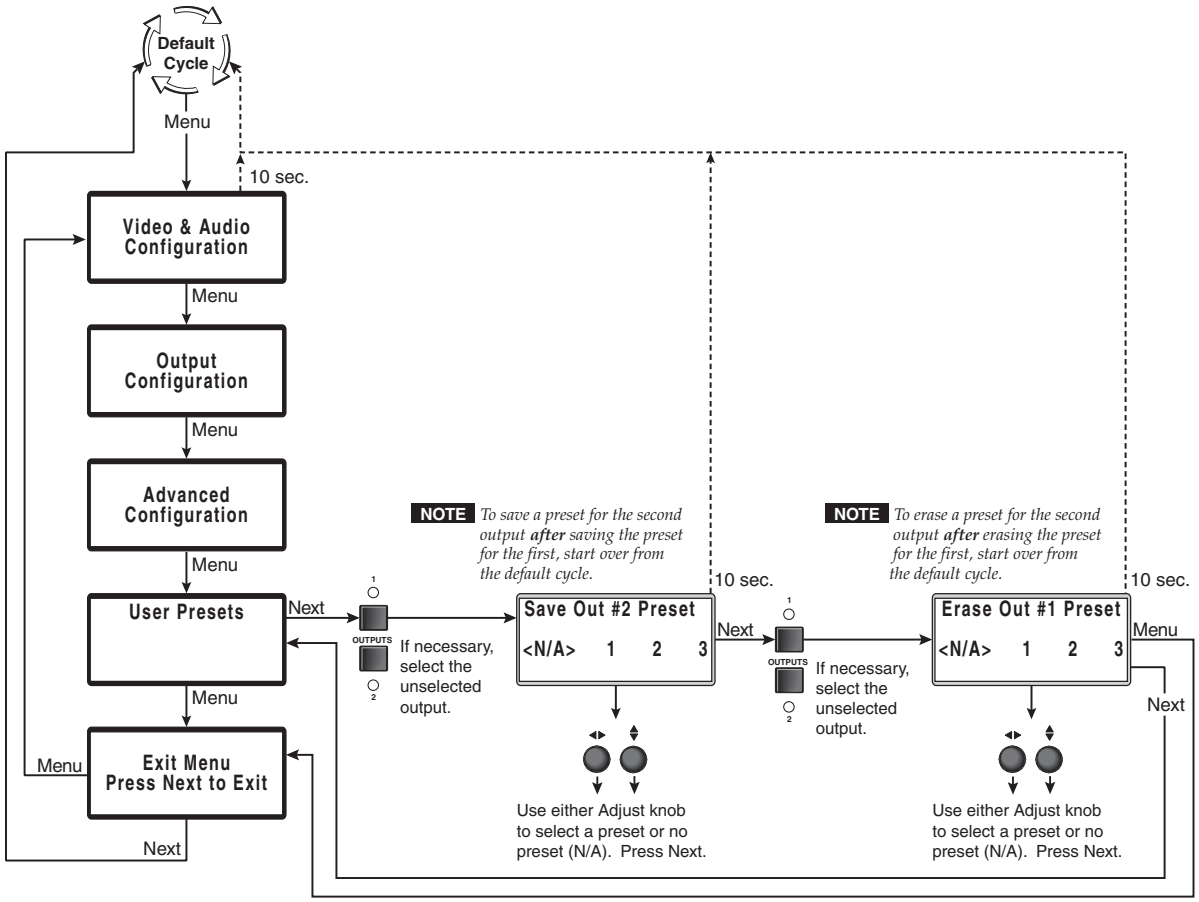

Default Cycle
Menu
10 sec.
Video & Audio Configuration
Menu
Output Configuration
Menu
Advanced Configuration
Menu
User Presets
Menu
Exit Menu
Press Next to Exit
Menu
Next
NOTE To save a preset for the second output after saving the preset for the first, start over from the default cycle.
Next
OUTPUTS
If necessary, select the unselected output.
Save Out #2 Preset
<N/A> 1 2 3
Use either Adjust knob to select a preset or no preset (N/A). Press Next.
10 sec.
NOTE To erase a preset for the second output after erasing the preset for the first, start over from the default cycle.
Next
OUTPUTS
If necessary, select the unselected output.
Erase Out #1 Preset
<N/A> 1 2 3
Use either Adjust knob to select a preset or no preset (N/A). Press Next.
10 sec.
Menu
Next

Figure 3-11 — User Presets menu flowchart

Save Preset submenu

Select the output with the settings that you want to save as a preset by pressing the desired Output button.

Rotate either the Adjust ↕ or the Adjust ↔ knob while in the Save Preset submenu to highlight (< >) one of three memory presets for the selected output or highlight N / A for no preset. Press the Next button to save the current settings to the selected preset. Select N / A and press the Next button to exit without saving the settings.

Presets are saved sets of values for the current color, tint, contrast, brightness, detail, sizing, and centering settings. Presets saved in nonvolatile memory; when the ISM is powered down and later powered back up, the settings are available for selection. Saving the settings to a preset number overwrites the settings previously written to that preset number.

NOTE *The color, tint, contrast, brightness, detail, sizing, and centering adjustments are tailored for the selected output rate. If you change the output rate and then recall a preset for the earlier rate, the adjustments recalled in the preset have no effect on the video output. However, if you then change back to the earlier output rate, the effects of the adjustments appear on the screen if they were not overwritten for the old output rate.*

User presets are recalled using the Input buttons. See “Recalling a user preset”, earlier in this chapter, for instructions on recalling a user preset.

Erase Preset submenu

Select the output with the settings that you want to erase by pressing the desired Output button.

Rotate either the Adjust ▲▼ or the Adjust ◄► knob while the Erase Presets submenu is active to highlight (< >) one of three memory presets to erase or highlight N / A for no preset. Press the Next button to erase the preset. Highlight N / A and press the Next button to exit without erasing the settings.

Exit menu

From the Exit menu (figure 3-12), press the Next button to return to the default display cycle, or press the Menu button to return to the Video & Audio Configuration menu

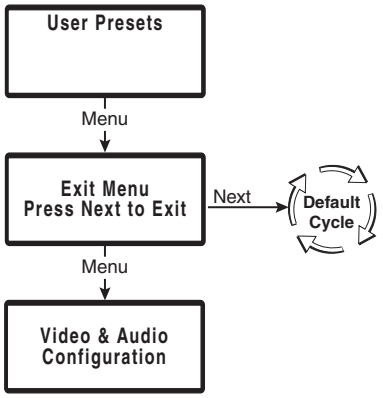
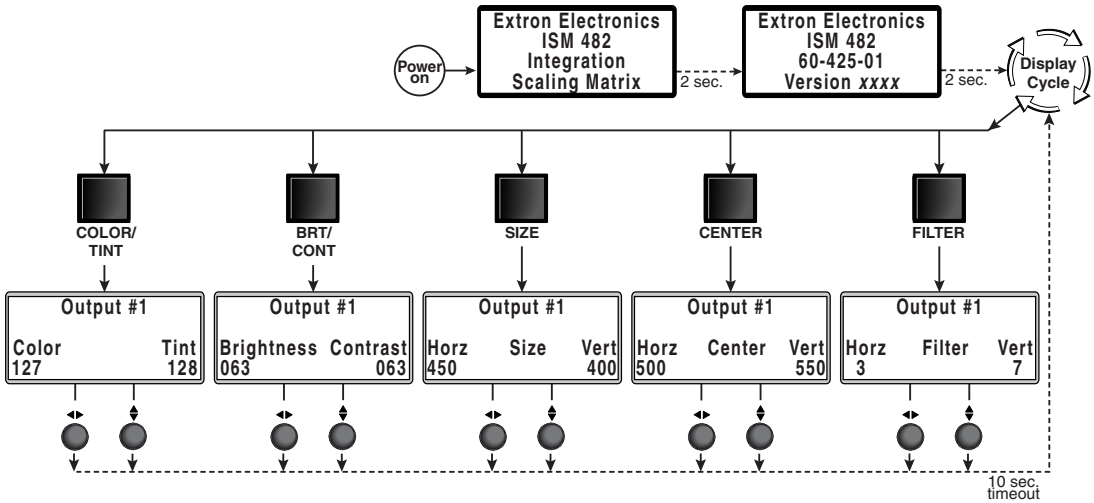


Figure 3-12 — Exit menu flowchart

Picture adjustments

The picture adjustments allow you to fine tune the image quality of the selected input. When you press one of the Picture Adjustments buttons (Color / Tint, Brightness / Contrast, Size, Center, or Filter) once, the corresponding image adjustment menu for the selected output (lit Output LED) image appears on the LCD screen. Select the other output using the Output buttons to call the image adjustment menu for the other output. In either screen, adjustments can then be made by rotating the Adjust ◂▸ knob or the Adjust ▴▾ knob. Picture adjustment settings are stored in nonvolatile memory; when the switcher is powered down and powered up, the settings are restored.

Adjust an image for centering, sizing, brightness, contrast, color, tint, zoom, or detail as follows (figure 3-13):



NOTE *Press the appropriate output button to select the desired output.*

NOTE *The Adjust ◂▸ knob and the Adjust ▴▾ knob are used to adjust the image settings on the left and right sides of the LCD screen, respectively.*

Figure 3-13 — Picture adjustments flowchart

1. Press the desired input button and output button to select an input-output tie to adjust.

   NOTE *The adjustments are made to the input signal as it is switched to the tied output (1 or 2) only. (The output LED is lit and the selected output is shown in the LCD). The adjustments do not affect the same input tied to the other output.*

   NOTE ***Color** adjustments are available only for component video, S-video, and composite video inputs.*

   ***Tint** adjustments are available only for S-video and composite video inputs.*

2. Press the appropriate picture adjustment button: color and tint, brightness and contrast (Brt / Cont), sizing (Size), centering (Center), or filter. The LCD display shows the name of the adjustment and the current setting value.

3. Rotate the Adjust ◂▸ knob or Adjust ▴▾ knob to vary the settings within the following adjustment ranges:

NOTE *The Adjust knobs have no mechanical limits to their rotation.*

- **Color/Tint**: Color adjusts within a range of 0 to 127.
  Tint adjusts within a range of 0 to 255.
- **Brightness/Contrast**: The range for both adjustments is 0 to 63.
- **Size**: Observe the display and turn the Adjust ◂▸ knob to increase or decrease the horizontal size of the image. Turn the Adjust ▴▾ knob to increase or decrease the vertical size of the image. The adjustment range depends on the input rate applied and the selected output resolution.
- **Center**: Observe the display and turn the Adjust ◂▸ knob to center the image horizontally or the Adjust ▴▾ knob to center the image vertically. The adjustment range depends on the input rate applied and the selected output resolution.
- **Horizontal and vertical filter (RGB or component video input)**:
  Horizontal (Horz) adjusts within a range of 0 to 3.
  Vertical (Vert) adjusts within a range of 0 to 7.
- **Filter (S-video and composite video input)**:
  Either knob adjusts within a range of 0 to 7.

4. Repeat steps **2** and **3** for each image adjustment to be made for that output.
5. If you want to set picture adjustment on the another tie, press the another input button or the other output button.

Front panel security lockout (Executive mode)

The front panel security lockout limits the operation of the Integration Scaling Matrix switcher from the front panel. When the switcher's front panel is locked, all of the front panel functions are disabled except for input and output selection and black / mute selection.

To toggle the front panel lock on and off, press and **hold** the Color / Tint and Center buttons for approximately 2 seconds (figure 3-14). The LCD displays **Executive Mode Enabled** or **Executive Mode Disabled** to indicate the mode. Release the buttons. The LCD also displays **Executive Mode Enabled** if you push a locked out button when the switcher's front panel is locked.

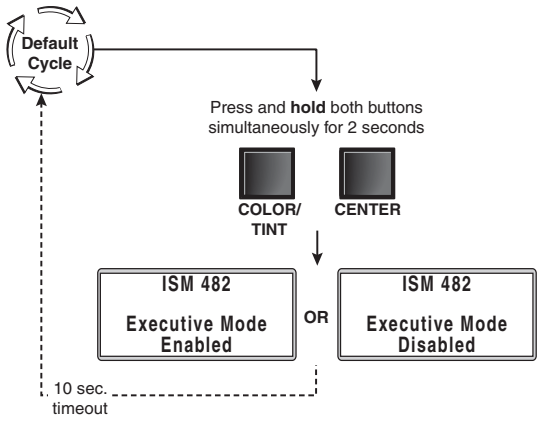


Figure 3-14 — Front panel security lockout flowchart

IP information

To set up the ISM for operation via its Ethernet port, you need to know and be able to change the IP address. One way to do this is via the IP address and hardware address screen.

To access the IP address and hardware address screen, press and **hold** the Color / Tint and Detail buttons while you apply power to the ISM (figure 3-15). When the ISM is finished intializing, it displays both addresses.

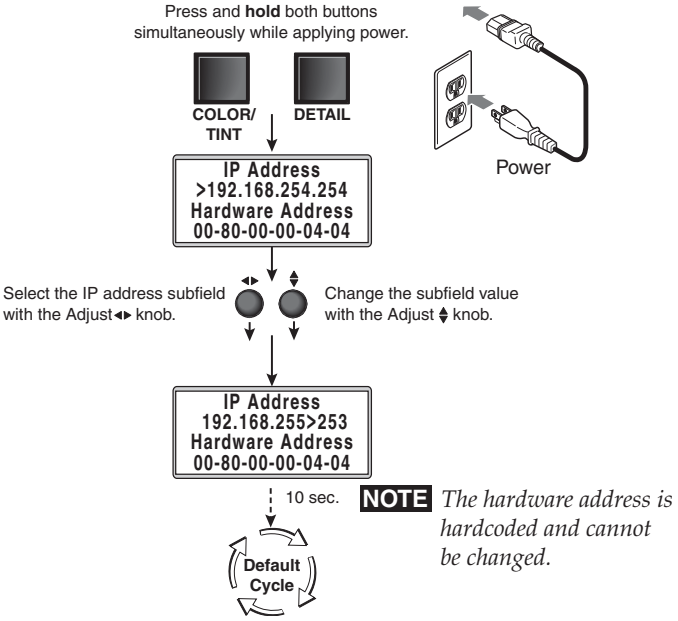


Figure 3-15 — IP information flowchart

If you need to change the IP address, use the Adjust ◂▸ knob to select the desired subfield. Rotate the Adjust ▴▾ knob to change the value. Repeat the adjustment for other subfields as required.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

NOTE *The hardware address is hardcoded and cannot be changed.*

Optimizing the Video

Perform the following steps, in sequence, after you have installed the ISM. This procedure will help you to configure the switcher for the best settings for your display environment. In a multi-screen environment, perform this procedure for each display.

See "Advanced Configuration menu", earlier in this chapter, to select and output a test pattern and to select and output blue-only video.

See "Picture adjustments", earlier in this chapter, to make adjustments to the picture quality.

See "User Presets menu", earlier in this chapter, to save presets.

1. **If you are using a digital display** such as an LCD or DLP projector, use the alternating pixels test pattern as a reference to adjust the phase and dot clock on the display devices. Proceed to step **2**.

   If you are using a CRT display, use the cross hatch test pattern as a reference to converge the display.

2. Set the ISM to output either the crop test pattern for 4:3 video or the appropriate aspect ratio test pattern.

3. Use the display's positioning controls to position the image so that you can see all sides of the test pattern on the display.

NOTE *For the best results of this optimizing procedure, do not use the ISM's centering controls to position the image.*

4. Select an input. Use the ISM's size and center functions to fill the crop or aspect ratio test pattern.

NOTE *If the input source is a DVD, set the DVD player to output a 16:9 aspect ratio (see "Setting up a DVD source" below) before sizing the image using the ISM's size function to correct the aspect ratio.*

NOTE *When you are sizing and centering a letterbox movie video source, increasing the brightness on the ISM makes it easier to see the top and bottom of the active video.*

5. If the input source is RGB, use the horizontal and vertical detail adjustments to increase the sharpness.

6. **For S-video and composite video inputs**, set the ISM to output blue-only video and to output the Color Bars test pattern. Using the blue Color Bars as a reference, use the ISM's color and tint controls to adjust the video's color and tint.

7. **For RGB video inputs**, set brightness and contrast levels. See "Picture adjustments", earlier in this chapter.

8. Save this setting into one of the user memories using the User Presets menu. See "User Presets menu", earlier in this chapter.

Setting up a DVD source

To get the best results when using a DVD as a video source, Extron recommends that the DVD player itself be set up to output an aspect ratio of 16:9 and not 4:3. Because all DVDs are mastered as 16:9, having them set up for anything else causes the player to internally scale and compress the signal. The DVD player's scaling and compression defeats the advantage of having 3-2 pulldown detection in the ISM.

All sizing adjustments to correct the aspect ratio should be done using the ISM.

To change the output aspect ratio of most DVD players:

1. Enter the DVD player's setup or action menu while the disc is stopped.

2. Select the 16:9 aspect ratio.

Optimizing the Audio

Each individual input audio level can be adjusted within a range of -24 dB to +9 dB, so there are no noticeable volume differences between sources and for the best headroom and signal-to-noise ratio. Adjust the audio gain and attenuation as follows:

1. Connect audio sources to all desired inputs and connect the audio outputs to output devices such as audio players. See "Input connections" and "Standard output connections" in chapter 2, "Installation". For best results, wire all of the inputs and the outputs unbalanced.
2. Power on the audio sources, the switcher, and the audio players.
3. Switch among the inputs (see "Selecting an input", earlier in this chapter), listening to the audio with a critical ear or measuring the output audio level with test equipment, such as a VU meter.
4. As necessary, adjust the audio level of each input (see "Video & Audio Configuration menu", earlier in this chapter) so that the output level is approximately the same for all selected inputs.

Troubleshooting

The following tips may help you in troubleshooting.

- Some symptoms may resemble others, so you may want to look through all of the examples before attempting to solve the problem.
- Be prepared to backtrack in case the action taken does not solve the problem.
- It may help to keep notes and sketches in case the troubleshooting process gets lengthy. This will also give you something to discuss if you call for technical support.
- Try simplifying the system by eliminating components that may have introduced the problem or made it more complicated.
- **For sync-related problems**: Portable digital projectors are designed to operate close to the video source. Sync problems may result from using long cables or from improper termination. A sync adapter, such as Extron's ASTA (active sync termination adapter), may help solve these problems.
- **For LCD and DLP projectors and plasma displays**: In addition to the sync-related information above, check the user's manual that came with the projector for troubleshooting tips, as well as for settings and adjustments. Each manufacturer may have its own terms, so look for terms like "auto setup", "auto sync", "pixel phase", and "tracking".

General checks

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if the LCD is displaying the default display cycle.
2. Ensure an active input is selected on the switcher.
3. Ensure that the proper signal format is supplied.
4. Check the cabling and make corrections as necessary.
5. Call the Extron S^3 Sales & Technical Support Hotline if necessary.

Specific problems

The table below shows some common operating problems and their solutions.

Problem	Cause	Solution
No image appears.	The input signal is incompatible with the. ISM.	Connect an input device that is compatible with the ISM.
	The input is improperly configured.	Use the Video & Audio Configuration submenu to select the correct input format.
	Freeze mode was entered via an SIS command when the image was black.	Deactivate freeze mode via an SIS command.
	The scaled output rate is too high for the display.	Change the scaled output to a compatible resolution.
The image is flashing.	The scaled output rate is too high for the display.	Change the scaled output to a compatible resolution.
The image is too soft.	The detail level needs to be changed.	Use the Filter button to change the detail level.

Chapter Four

Programmer's Guide

RS-232 Link

Ethernet Link

Symbols

Switcher-Initiated Messages

Host-to-Switcher Instructions

RS-232 Link

The switcher's rear panel Remote 9-pin D female connector (figure 4-1) can be connected to the RS-232 serial port output of a host device such as a computer running the HyperTerminal utility or a control system. This connection makes software control of the switcher possible.

Pin	RS-232	Function
1	—	Not used
2	TX	Transmit data
3	RX	Receive data
4	—	Not used
5	Gnd	Signal ground
6	—	Not used
7	—	Not used
8	—	Not used
9	—	Not used

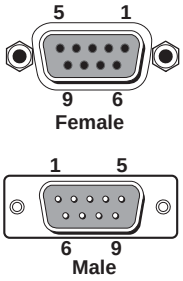
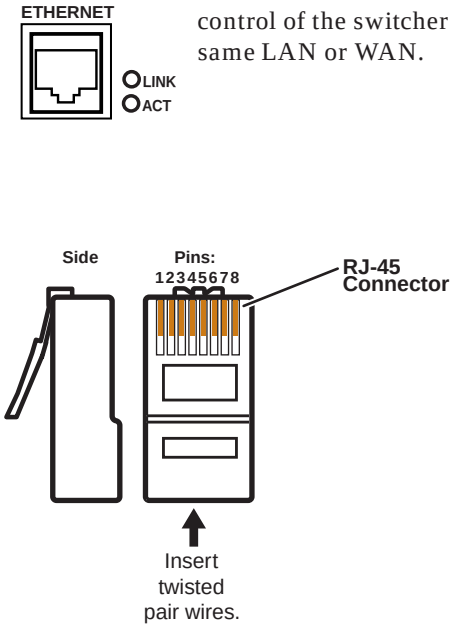


Figure 4-1 — Remote connector pin arrangement

The protocol is 9600 baud, 8-bit, 1 stop bit, no parity, and no flow control.

Ethernet Link

The rear panel Ethernet connector on the switcher can be connected to the an Ethernet LAN or WAN (figure 4-2). This connection makes SIS control of the switcher possible using a computer connected to the same LAN or WAN.



Patch (straight) cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Figure 4-2 — RJ-45 connector pinout tables

Ethernet connection

The cable can be terminated as either a patch cable or a crossover cable (figure 4-2) and must be properly terminated for your application:

- **Patch (straight) cable** — Connection of the ISM to an Ethernet hub, router, or switcher that also hosts a controlling computer
- **Crossover cable** — Direct connection between the ISM and a computer

Default address

To access the switcher via the Ethernet port, you need the switcher's IP address. If the address has been changed to an address comprised of words and characters, the actual numeric IP address can be determined using the front panel (see "IP information" in chapter 3, "Operation") or the Ping utility (see "Ping to determine the switcher's IP address" or "Ping to determine the Web IP address" in appendix A, "Ethernet Connection", for more details). If the address has not been changed, the factory-specified default is 192.168.254.254.

Symbols

Symbols (Xn values), defined below, are used throughout the discussions of the switcher-initiated messages that begins on the next page and the command / response table that begins on page 4-8. The symbols represent variables in the switcher-initiated messages and the command / response table fields.

↵ = CR / LF (carriage return / line feed) (hex 0D 0A)

← = CR (no line feed)

• = Space

Esc = Escape key

X1 = Input number (1 through 8)

X2 = Output number (1 or 2)

X3 = 000 = off, 001 = on

X4 = Input video type:

000 = RGB	005 = Betacam 60
001 = RGBcS	006 = HDTV
002 = YUVi	007 = S-video
003 = YUVp	008 = Composite
004 = Betacam 50	

X5 = Scaler resolution:

00 = 640x480	09 = 1365x1024
01 = 800x600	10 = 720p
02 = 832x624	11 = 1080p
03 = 848x480	12 = 1080i
04 = 852x480	13 = 1400 x 1050
05 = 1024x768	14 = 576p
06 = 1280x768	15 = 1366x768
07 = 1280x1024	16 = 1365x768
08 = 1360x765	

X6 = Video refresh rate:

000 = 50 Hz	003 = 75 Hz
001 = 56 Hz	004 = 85 Hz
002 = 60 Hz	005 = AFL*

NOTE *Lock or AFL is Accu-RATE Frame Lock™ (PAL = 50 Hz, NTSC = 59.94 Hz)*

X7 = Output video type: 00 = RGBHV, 01 = RGBS

X8 = Output sync polarity:

00 = H– / V–	02 = H+ / V–
01 = H– / V+	03 = H+ / V+

X9 = Color value (0 thru 127)

X10 = Tint value (0 thru 255)

X11 = Brightness and contrast value (000 thru 63)

X12 = Size value (range depends on the resolution)

X13 = Centering value (range depends on the resolution)

X14 = Blanking value (000 thru 200)

X15 = Pixel sampling phase (000 through 031)

X16 = Horizontal filter value (000 thru 003)

X17 = Vertical filter or composite / S-video detail filter (001 thru 007)

X18 = Preset number (01 thru 03)

X19 = Output 1 / Output 2 selection:

Output 1/Output 2	Output 1/Output 2
00 = Off / Off	02 = Off / On
01 = On / Off	03 = On / On

X20 = RGB delay in 0.01 second steps (00 [no delay] to 50 [5.0 secs])

X21 = Test pattern type (001 through 010):

001 = Color Bars	006 = alternating pixels
002 = crosshatch	007 = film aspect ratio 1.78
003 = 4x4 crosshatch	008 = film aspect ratio 1.85
004 = gray scale	009 = film aspect ration 2.35
005 = crop	010 = ramp

X22 = Gain / attenuation (–24dB to +•9dB, each step = 1 dB)

X23 = Gain value (numeric dB value, 0 to +9)

X24 = Attenuation value (numeric dB value, –1 to –24)

X25 = *nnn.nn*, where

Hrt = horizontal rate (kHz)
Vrt = vertical rate (Hz)

xxx:xx means signal out of range

X26 = Detected input signal standard (0 through 4):

0 = none
1 = NTSC 3.58
2 = PAL
3 = NTSC 4.43
4 = SECAM
– = not applicable (occurs when the input is set for RGB, YUV, or progressive YUV)

Switcher-Initiated Messages

When a local event such as power-up or a front panel operation occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed in the following pages. The messages are underlined.

The switcher does not expect a response from the host; but, for example, the host program might request a new status.

Power-up

(c) Copyright 2002, Extron Electronics, ISM 482, V*x.xx* ↵

The switcher initiates the copyright message when it is first powered on. Vxxxx is the firmware version number.

Ties creation

Out[X2] • In[X1] • All ↵

A front panel video and audio switching operation has occurred. [X2] is the output number and [X1] is the input number.

Out[X2] • In[X1] • RGB ↵

A front panel video-only switching operation has occurred. [X2] is the output number and [X1] is the input number.

Out[X2] • In[X1] • Aud ↵

A front panel audio-only switching operation has occurred. [X2] is the output number and [X1] is the input number.

Input and output video type

[X1]Typ[X4] ↵

A front panel input video type selection has occurred. [X1] is the input number and [X4] is the input video type.

[X2]Rte[X5][X6] ↵

A front panel output video format selection has occurred. [X2] is the output number, [X5] is the output resolution, and [X6] is the output refresh rate.

[X2]Syn[X7] ↵

A front panel output video type selection has occurred. [X2] is the output number and [X7] is the output video format (RGBHV or RGBS).

[X2]Pol[X8] ↵

A front panel output video polarity selection has occurred. [X2] is the output number and [X8] is the output sync polarity.

Picture adjustments

X2Col X9 ↵

A front panel color adjustment has occurred. X2 is the output number tied to the adjusted input and X9 is the color variable.

X2Tin X10 ↵

A front panel tint adjustment has occurred. X2 is the output number tied to the adjusted input and X10 is the tint variable.

X2Brt X11 ↵

A front panel color brightness adjustment has occurred. X2 is the output number tied to the adjusted input and X11 is the brightness variable.

X2Con X11 ↵

A front panel contrast adjustment has occurred. X2 is the output number tied to the adjusted input and X11 is the contrast variable.

X2Hsz X12 ↵

A front panel horizontal size adjustment has occurred. X2 is the output number and X12 is the size variable.

X2Vsz X12 ↵

A front panel vertical size adjustment has occurred. X2 is the output number and X12 is the size variable.

X2Hph X13 ↵

A front panel horizontal centering adjustment has occurred. X2 is the output number and X13 is the centering variable.

X2Vph X13 ↵

A front panel vertical centering adjustment has occurred. X2 is the output number and X13 is the centering variable.

X2Blt X14 ↵

A front panel top line blanking adjustment has occurred. X2 is the output number and X14 is the blanking variable.

X2Blb X14 ↵

A front panel bottom line blanking adjustment has occurred. X2 is the output number and X14 is the blanking variable.

X2Phs X15 ↵

A front panel pixel phase adjustment has occurred. X2 is the output number and X15 is the pixel phase variable.

X2Dhz X16 ↵

A front panel horizontal detail filter adjustment has occurred for the **RGB or component video** input tied to output X2. X16 is the filter variable.

X2Dvz X17 ↵

A front panel vertical detail filter adjustment has occurred for the **RGB or component video** input tied to output X2. X17 is the filter variable.

X2Dvz X17 ↵

A front panel horizontal detail filter adjustment has occurred for the **S-video or composite video** input tied to output X2. X17 is the filter variable.

1Blu X19 ↵

The blue-only mode has been turned on or off from the front panel for one or both outputs. X19 is the on / off status for the either or both outputs. The leading "1" is meaningless.

1Fil X19 ↵

The edge enhancement mode has been turned on or off from the front panel for one or both outputs. X19 is the on / off status for the either or both outputs. The leading "1" is meaningless.

RGB delay

X2Dly X20 ↵

A front panel RGB delay adjustment has occurred. X2 is output number and X20 is the delay value, in 0.01 second steps. X20 can be as much as 50 = 5.0 seconds.

Test pattern

Tst X19 * X21 ↵

A test pattern has been turned on or off from the front panel for one or both outputs. X19 is the on / off status for the two outputs and X21 is the test pattern selected.

Audio gain and attenuation

X1Aud X22 ↵

A front panel audio input level adjustment has occurred. X1 is input number and X22 is the audio gain or attenuation level.

Video and audio mute

X2Vmt X3 ↵

A front panel video mute operation has occurred. X2 is output number and X3 is the mute status: 0 = off (video not muted), 1 = on (video muted).

X2Amt X3 ↵

A front panel audio mute operation has occurred. X2 is output number and X3 is the mute status: 0 = off (audio not muted), 1 = on (audio muted).

PAL film mode

X1Flm X3 ↵

The PAL film mode has been selected or deselected from the front panel for the selected input. X1 is input number and X3 is the on / off status for PAL film mode.

Automated adjustments

Img X3 ↵

The Auto Image feature has been turned on or off from the front panel for all tie creations. X3 is the on / off status.

Aut[X3] ↵

The Auto Presets feature has been turned on or off from the front panel for all tie creations. [X3] is the on / off status.

1Enh[X19] ↵

The enhanced mode feature has been turned on or off from the front panel for S-video or composite video that is tied to one or both outputs. [X19] is the on / off status for the two outputs. The leading "1" is meaningless.

[X2]Reconfig ↵

The input selected for the [X2] output has been adjusted using the Auto Image feature or a user preset.

Host-to-Switcher Instructions

The switcher accepts SIS commands through its RS-232 port and / or its Ethernet port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each switcher response to an SIS command ends with a carriage return and a line feed (CR / LF = ↵), which signals the end of the response character string. A string is one or more characters.

Switcher error responses

When the switcher receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the switcher is unable to perform the command because the command is invalid or contains invalid parameters, the switcher returns an error response to the host. The error response codes are:

E01 — Invalid input channel number (too large)
E10 — Invalid command
E11 — Invalid preset number (zero or too large)
E12 — Invalid output number (zero or too large)
E13 — Invalid value (out of range)

Using the command/response table

The command / response table begins on the next page. Except for the gain and attenuation settings and the filter settings, upper or lower case letters are acceptable in the command field. Command and response examples are shown throughout the table.

The table below shows the hexadecimal equivalent of each ASCII command.

NOTE *With the exception of the audio gain and attenuation (G and g) and horizontal and vertical filtering (D and d) commands, the SIS commands are **not** case sensitive.*

ASCII to HEX Conversion Table																	
Space	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F

Esc	1B
CR	ØD
LF	ØA

Command/response table for SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Creating ties			
Create video and audio tie	X1*X2!	OutX2•InX1•All↵	Tie input X1 to output X2.
Example:	1*2!	Out2•In1•All↵	Input 1 video and audio is tied to output 2.
Create video only tie	X1*X2&	OutX2•InX1•RGB↵	Tie video input X1 to output X2.
Example:	5*2&	Out2•In5•RGB↵	Input 5 video only is tied to output 2.
Create audio only tie	X1*X2$	OutX2•InX1•Aud↵	Tie audio input X1 to output X2.
Read ties			
Read video and audio tie	X2!	X1↵	Video and audio input X1 are tied to output X2.
Read video only tie	X2&	X1↵	Video input X1 is tied to output X2.
Read audio only tie	X2$	X1↵	Audio input X1 is tied to output X2.
Video mute			
Video mute on	X2*1B	X2VmtX3↵	Set the X2 video output to black.
Video mute off	X2*0B	X2VmtX3↵	Set the X2 video output to the selected input 1 through 8.
View video mute status	X2B	X3↵	Video mute is X3 for output X2.
Input video type			
Set video type	X1*X4\	X1TypX4↵	Specify input X1 video type.
Example:	4*3\	4Typ003↵	Specify input 4 type as YUVp.
View video type	X1\	X4↵	Input X1 video type is X4.
Scaler output video type			
Set output resolution and rate	X2*X5*X6=	X2RteX5*X6↵	Command character is "equals".
Example:	1*5*4=	1Rte005*004↵	Set output 1 to 1024x768 at 85 Hz.
View resolution and rate	X2=	X2RteX5*X6↵	
Color			
NOTE	***Color*** *adjustments are available only for interlaced component video (YUVi), S-video, and composite video inputs.*		
	The X2 value specified is the output to which the adjusted input is tied.		
Set a specific color value	X2*X9C	X2ColX9↵	Specify the color adjustment.
Increment color value	X2+C	X2ColX9↵	Increase the color setting by one.
Decrement color value	X2–C	X2ColX9↵	Decrease the color setting by one.
View the color value	X2C	X9↵	Show the color setting.
Tint			
NOTE	***Tint*** *adjustments are available only for S-video and composite video inputs.*		
	The X2 value specified is the output to which the adjusted input is tied.		
Set a specific tint value	X2*X10T	X2TinX10↵	Specify the tint adjustment.
Increment tint value	X2+T	X2TinX10↵	Increase the tint setting by one.
Decrement tint value	X2–T	X2TinX10↵	Decrease the tint setting by one.
View the tint value	X2T	X10↵	Show the tint setting.

Command/response table for SIS commands (cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Brightness			
NOTE *The X2 value specified is the output to which the adjusted input is tied.*			
Set a specific brightness value	X2*X11Y	X2BrtX11↵	Specify the brightness adjustment.
Increment brightness value	X2+Y	X2BrtX11↵	Increase the brightness.
Decrement brightness value	X2–Y	X2BrtX11↵	Decrease the brightness.
View the brightness value	X2Y	X11↵	Show the brightness setting.
Contrast			
NOTE *The X2 value specified is the output to which the adjusted input is tied.*			
Set a specific contrast value	X2*X11^	X2ConX11↵	Specify the contrast adjustment.
Increment contrast value	X2+^	X2ConX11↵	Increase the contrast.
Decrement contrast value	X2–^	X2ConX11↵	Decrease the contrast.
View the contrast value	X2^	X11↵	Show the contrast setting.
Horizontal size			
Set a specific horizontal size	X2*X12:	X2HszX12↵	Specify the horizontal size.
Increase the horizontal size	X2+:	X2HszX12↵	Widen the picture.
Decrease the horizontal size	X2–:	X2HszX12↵	Make the picture narrower.
View the horizontal size	X2:	X12↵	Show the horizontal size.
Vertical size			
Set a specific vertical size	X2*X12;	X2VszX12↵	Specify the vertical size.
Increase the vertical size	X2+;	X2VszX12↵	Make the picture taller.
Decrease the vertical size	X2–;	X2VszX12↵	Make the picture shorter.
View the vertical size	X2;	X12↵	Show the vertical size.
Horizontal shift			
Set a specific horizontal position	X2*X13H	X2HphX13↵	Specify the horizontal position.
Increment right	X2+H	X2HphX13↵	Shift the picture right.
Decrement left	X2–H	X2HphX13↵	Shift the picture left.
View the horizontal position	X2H	X13↵	Show the horizontal position.
Vertical shift			
Set a specific vertical position	X2*X13/	X2VphX13↵	Specify the vertical position.
Increment up	X2+/	X2VphX13↵	Shift the picture up.
Increment down	X2–/	X2VphX13↵	Shift the picture down.
View the vertical position	X2/	X13↵	Show the vertical position.
Top blanking			
Set a top blanking value	X2*X14(	X2BltX14↵	
Example:	1*2(	1Blt2↵	Blank the top two lines of the program output.
Increment top blanking value	X2+(	X2BltX14↵	Increase blanking value 1 line.
Decrement top blanking value	X2–(	X2BltX14↵	Decrease blanking value 1 line.
View the top blanking value	X2(	X14↵	

Command/response table for SIS commands (cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Bottom blanking			
Set a bottom blanking value	X2*X14)	X2BlbX14↵	
Example:	2*5)	2Blb5↵	Blank the bottom five lines of the preview output.
Increment bottom blanking value	X2+)	X2BlbX14↵	Increase blanking value 1 line.
Decrement bottom blanking value	X2–)	X2BlbX14↵	Decrease blanking value 1 line.
View the bottom blanking value	X2)	X14↵	
Pixel phase			
Set a specific pixel sampling phase	X2*X15U	X2PhsX15↵	Specify the pixel sampling phase.
Increment sampling value	X2+U	X2PhsX15↵	Increase the phase value.
Decrement sampling value	X2–U	X2PhsX15↵	Decrease the phase value.
View the sampling value	X2U	X15↵	Show the pixel sampling phase.
Horizontal detail filter (RGB and component video inputs)			
NOTE	*The **horizontal detail filter** is available only for RGB and component video inputs. The same command with a different Xn variable is available to set a combined detail filter for S-video and composite video inputs.*		
	The X2 value specified is the output to which the filtered input is tied.		
	*The command (D) **is case sensitive**.*		
Set a specific filter value	X2*X16D	X2DhzX16↵	Set the horizontal detail level.
Increment filter value	X2+D	X2DhzX16↵	Increase the horizontal detail level.
Decrement filter value	X2–D	X2DhzX16↵	Decrease the horizontal detail level.
View the horizontal filter value	X2D	X16↵	Show the horizontal detail level.
Vertical detail filter (RGB and component video inputs)			
NOTE	*The **vertical detail filter** is available only for RGB and component video inputs.*		
	The X2 value specified is the output to which the filtered input is tied.		
	*The command (d) **is case sensitive**.*		
Set a specific filter value	X2*X17d	X2DvzX17↵	Set the vertical detail level.
Increment filter value	X2+d	X2DvzX17↵	Increase the vertical detail level.
Decrement filter value	X2–d	X2DvzX17↵	Decrease the vertical detail level.
View the vertical filter value	X2d	X17↵	Show the vertical detail level.
Detail filter (S-video and composite video inputs)			
NOTE	*Composite and S-video inputs support a single detail filter only, rather than separate horizontal and vertical filters. To apply a detail filter to the scaled output when the input is composite video or S-video, use the same command as the horizontal filter (*D*) with the X17 variable.*		
	The X2 value specified is the output to which the filtered input is tied.		
Set a specific filter value	X2*X17D	X2DvzX17↵	Set the detail filter level.
Increment filter value	X2+D	X2DvzX17↵	Increase the detail filter level.
Decrement filter value	X2–D	X2DvzX17↵	Decrease the detail filter level.
View the vertical filter value	X2D	X17↵	Show the detail filter level.

Command/response table for SIS commands (cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Auto Memories			
Auto memories on	1M	Aut[X3]↵	Set the ISM to apply auto memories settings to all selected inputs.
Auto memories off	0M	Aut[X3]↵	Set the ISM to not apply auto memories settings.
View auto memories status	M	[X3]↵	Auto memories is [X3] (on or off) for all inputs.
User presets			
NOTE *The [X2] value specified is the output to which the input with the associated user preset is tied.*			
Save user preset	[X2]*[X18],	Spr[X2]•[X18]↵	Command code is a comma. Save the [X2] outputs settings as preset [X18].
Recall user preset	[X2]*[X18].	Rpr[X2]•[X18]↵	Command code is a period. Recall preset [X18] settings for [X2] output.
Freeze			
Enable	[X2]*1F	[X2]Frz1↵	Output a "frozen" video image.
Disable	[X2]*0F	[X2]Frz0↵	Turn off freeze (output motion video).
View the freeze status	[X2]F	[X3]↵	Show the freeze status.
Example:	1f	0↵	Freeze mode is off.
Test pattern			
Select test pattern for an output	[X19]*[X21]J	Tst [X19]*[X21]↵	Select a test pattern for the [X19] output(s).
View test pattern	J	[X19]*[X21]↵	Show the test pattern.
Example:	j	1*002↵	Crosshatch test pattern was selected for output 1 only.
Audio gain and attenuation			
NOTE *The set gain (G) and set attenuation command (g)* ***are case sensitive****. The increment, decrement and view commands are not case sensitive.*			
Set gain	[X1]*[X23]G	[X1]Aud[X22]↵	Set gain for input [X1] to +[X23]dB.
Example:	4*3G	4Aud+•3↵	Set gain for input 4 to +3 dB.
Set attenuation	[X1]*[X24]g	[X1]Aud[X22]↵	Set attenuation for input [X1] to –[X22] dB.
Increment level	[X1]+G	[X1]Aud[X22]↵	Increase input [X1] audio level by +1 dB.
Decrement level	[X1]–G	[X1]Aud[X22]↵	Decrease input [X1] audio level by –1 dB.
View audio level	[X1]G	[X22]↵	View gain for input [X1].
Example	4G	–•3↵	The ISM reports that the input 4 audio level is at –3 dB of attenuation.
Audio mute			
Audio mute on	[X2]*1Z	[X2]Amt[X3]↵	Mute the [X2] audio output.
Audio mute off	[X2]*0Z	[X2]Amt[X3]↵	Unmute the [X2] audio output.
View audio mute status	[X2]Z	[X3]↵	Audio mute is [X3] for output [X2].

Command/response table for SIS commands (cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Executive mode			
Enable (lock image adjustments)	1X	Exe1↵	Lock front panel adjustments; adjust image via RS-232 only.
Disable	0X	Exe0↵	Adjustments and selections can be made from the front panel.
View the executive mode status	X	X3↵	Show executive mode status.
Example:	X	0↵	Executive mode is off.
Verbose mode			
NOTE *The default for verbose mode is **on** for the RS-232 connection and **off** for Ethernet connections.*			
Disable (block reports)	Esc0CV←	Vrb0↵	Turn off verbose mode. The ISM does not send the reports listed in "Switcher-initiated messages" earlier in this chapter.
NOTE *Disabling verbose mode blocks reports for **front panel operations only, to this connection (RS-232 or Ethernet) only**. The ISM continues to send responses to SIS commands to all ports. The ISM continues to send reports for front panel operations to other connections.*			
Enable (allow reports)	Esc1CV←	Vrb1↵	Turn on verbose mode. The ISM sends all reports.
View the executive mode status	EscCV←	X3↵	Show verbose mode status.
Example:	EscCV←	1↵	Verbose mode is on (the ISS issues reports).
Information requests			
Query firmware version number	Q	*x.xx*↵	Show the controller firmware version.
Request part number	N	*zz-zzz-zz*↵	Show the ISM's part #.
Request general information	X2I	(See below.) Vid X1 • Aud X1 • Frz X3 • Hrt X25 • Vrt X25 • Std X26 ↵	Show the ISM's status.
NOTE *The response to the* View File Directory *command differs, depending on whether the command is sent via an RS-232 or Telnet connection or sent via a Web browser connection.*			
View file directory (RS-232)	EscDF←	*filename date/time length*↵ *filename date/time length*↵ *filename date/time length*↵ *filename date/time length*↵ nnnn *Bytes Left*↵ ↵	
View file directory (Web)	EscDF←	***Switcher response*** *File [1] = 'filename1, date1, filesize1';* *File [2] = 'filename2, date2, filesize2';* *File [3] = 'filename3, date3, filesize3';* *File [4] = 'filename4, date4, filesize4';* *File [n] = 'filenamen, daten, filesizen';*	

Command/response table for SIS commands (cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Resets			
Zap all audio adjustments	Esc zA ←	ZapA ↵	Reset all audio levels to 0dB.
Zap all ISM settings	Esc zXXX ←	Zapx ↵	**Reset all settings**: All inputs: RGB Ouput: RGBHV 1024x768 @ 60Hz RGB delay: 0.0 sec. (both outputs) Audio level: 0dB Filtering: Horz. = 3, Vert. = 7 Blanking: 0, top and bottom Pixel phase: 16 Auto Image: Off Auto Memory recall: On
Absolute reset	Esc ZQQQ ←	Zpq ↵	Similar to **Zap all ISM settings**, plus clears IP address to 192.168.254.254 and deletes user and adminstrator passwords.

Command/response table for IP SIS commands

X30	= ISM name	(Up to 12 characters)
X31	= GMT Time and date (set)	MM / DD / YY-HH:MM:SS, where MM = month: 01 (January) through 12 (December) DD = day: 01 through 31 YY = year: 00 through 99 HH = hour: 00 through 23 MM = minutes: 00 through 59 SS = seconds: 00 through 59
X32	= Time and date (read)	In the format: Day, • DD • MMM • YYYY • HH:MM:SS GMT, where Day = weekday: Mon through Sun DD = day: 01 through 31 MM = month: Jan through Dec YYYY = year: 2000 through 2099 HH = hour: 00 through 23 MM = minutes: 00 through 59 SS = seconds: 00 through 59
X33	= IP address	###.###.###.###
X34	= Password	12 alphanumeric characters
X35	= Hardware address	##-##-##-##-##-##
X36	= Number of open connections	0 - 255

Command/response table for IP SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Set ISM name (location)	Esc X30 CN ←	Ipn • X30 ↵	
Read ISM name (location)	Esc CN ←	X30 ↵	
Set GMT / date	Esc X31 CT ←	Ipt • X32 ↵	
NOTE *The date and time entered should be Greenwich Mean Time (GMT).*			
Read GMT / date	Esc CT ←	X32 ↵	
Set IP address	Esc • X33 CI ←	Ipi • X33 ↵	The switcher sends the response, but the host may not receive it.
Read IP address	Esc CI ←	X33 ↵	
Read hardware address	Esc CH ←	X35 ↵	
Read # of open connections	Esc CC ←	X36 ↵	
Set administrator password	Esc • X34 CA ←	Ipa X34 ↵	
Read administrator password	Esc CA ←	X34 ↵	
Set user password	Esc • X34 CU ←	Ipu X34 ↵	
Read user password	Esc CU ←	X34 ↵	
NOTE *When the computer is connected to the switcher via the RS-232 link, the Admin and User password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.*			

Command/response table for special function SIS commands

The syntax for setting a special function is Xn*X?# where Xn is the value or variable (such as 35 in the first example below), X? is the function number (such as "set RGB delay" in the first example below), and # is the execute command. To view a function's setting, use X? # where X? is the function number.

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Delay times			
RGB delay (Triple-Action Switching)	X2*X20*3#	Dly X20 ↵	Set switching delay of the selected input to the selected output. Adjustable in 0.01 second steps up to 50 = 5.0 seconds. 0 = 0.0 seconds (default), 1 = 0.1 seconds, 2 = 0.2 seconds, and so on.
Example:	1*35*3#	Dly35 ↵	Set RGB delay for output 1 set to 3.5 seconds.
Read RGB delay	X2*3#	X20 ↵	
Scaler settings			
Output sync format	X2*X7*6#	Syn X7 ↵	0 = RGBHV (default). 1 = RGBS.
Example:	2*0*6#	Syn00 ↵	RGBHV signal on output 2.
Read output sync format	X2*6#	X7 ↵	
Output polarity	X2*X8*7#	Pol X8 ↵	X8:**Horizontal/Vertical polarity** 0 = H– / V– 2 = H+ / V– 1 = H– / V+ 3 = H+ / V+
Example:	1*1*7#	Pol01 ↵	H– / V+ polarity on output 1.
Read output sync polarity	X2*7#	X8 ↵	

Command/response table for special function SIS commands (cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Blue screen			
Blue screen (blue & sync output only)	X19*8#	1BluX19↵	X19: **Output 1/2** **Output 1/2** 00 = Off / Off 02 = Off / On 01 = On / Off 03 = On / On
Example:	1*8#	1Blu1↵	Blue and sync output for setup.
Read blue screen	8#	X19↵	
Edge smoothing			
Edge smoothing	X19*16#	1FilX19↵	X19: **Output 1/2** **Output 1/2** 00 = Off / Off 02 = Off / On 01 = On / Off 03 = On / On
Example:	1*16#	1Fil01↵	Enable edge smoothing.
Read edge smoothing	16#	X19↵	
Enhanced mode			
Enhanced mode	X19*12#	1EnhX19↵	X19: **Output 1/2** **Output 1/2** 00 = Off / Off 02 = Off / On 01 = On / Off 03 = On / On
Example:	1*12#	1Enh01↵	Enable enhanced mode.
Read enhanced mode	12#	X19↵	
Auto Image			
Set Auto Image	X3*13#	ImgX3↵	0 = off, 1 = on.
Example:	1*13#	Img001↵	Set Auto Image to on.
Execute Auto Image	X19*14#	ImgX19↵	X19: Auto Image input tied to output: **Output 1/2** **Output 1/2** 01 = Yes / No 03 = Yes / Yes 02 = No / Yes
		X2Reconfig↵	Output X2 Auto Image is complete.
		X2Reconfig↵	Output X2 Auto Image is complete.
NOTE *If Auto Image adjustments are not necessary for an input, the X2Reconfig↵ message may not be received.*			
Read auto image	14#	X19↵	
PAL film mode			
Set PAL film mode	X1*X3*18#	X1FlmX3↵	X3: 0 = off, 1 = on.
Example:	8*1*18#	8Flm01↵	The ISM uses its 2:2 pulldown (PAL) video processing algorithms to scale input 8.
Read PAL film mode	X1*18#	X3↵	X3: 0 = off, 1 = on.

Command/response table for advanced instruction set commands

The advanced instruction set consist of four hexadecimal commands for uploading and downloading all or a portion of the switcher's memory. These commands are for use by knowledgeable programmers, and result in a dump of data from (upload) or to (download) the switcher. Programmers can use the commands to exactly duplicate the settings among switchers with a minimum of effort.

Command	Hex Command (host to switcher)	Response (switcher to host)	Additional description
Memory backup			
Read all memory contents	90 91	{8226 data bytes+1 byte checksum}	Upload (switcher to control device) all color, tint, contrast, brightness, detail, sizing, and centering settings; all user presets; and all auto memories for all inputs and both outputs.
Write all memory contents	90 92+8226 data bytes+1 byte checksum	Dn1↵	Download (control device to switcher) all color, tint, contrast, brightness, detail, sizing, and centering settings; all user presets; and all auto memories for all inputs and both outputs.
Read partial contents	x2 90 93	{26 data bytes+1 byte checksum}	Upload (switcher to control device) color, tint, contrast, brightness, detail, sizing, and centering settings; all user presets; and all auto memories for the input selected for output x2.
Write partial contents	x2 90 94+26 data bytes+1 byte checksum	Dn1↵	Download (control device to switcher) color, tint, contrast, brightness, detail, sizing, and centering settings; all user presets; and all auto memories for the input selected for output x2.

Chapter Five

Switcher Software

Control Software for Windows®

Button-Label Generator

Switcher Software

Control Software for Windows®

The Windows-based Extron ISSISM Control Program communicates with the switcher via the Ethernet LAN port or the rear panel Remote RS-232 / RS-422 port to provide an easy way to set up and operate the switcher. The program is compatible with Windows 2000 and Windows XP. Updates to these programs can be downloaded from the Extron Web site (http: / / www.extron.com).

Installing the software

The program is contained on the Extron Software Products CD-ROM. Install the software as follows:

1. Insert the CD-ROM into the drive. The installation program should start automatically. If it does not self-start, run Launch.exe from the CD.

   The Extron software CD window appears (figure 5-1).

Extron Software CD - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Extron Electronics
Extron Software Products
Disc B: Issue 2007.1
800.633.9876
Products
Software
Manuals
Home
extron.com
Contact Us
<click to select product>
www.extron.com
For the latest product information, visit www.extron.com
Extron Software Products
Disc B: Issue 2007.1
For more than 20 years, Extron Electronics has manufactured professional A/V system products, including computer-video interfaces, switchers, matrix switchers, distribution amplifiers, signal processing devices, Ethernet control interfaces, and high resolution cable. Extron offers solutions for integration of video and audio into presentation systems for a variety of environments, such as boardrooms, classrooms and training centers, lecture halls, command and control centers, and more.
Products
Find a product, and view available files.
Software
Install control and configuration software.
Done
My Computer

Figure 5-1 — Software CD window

2. Click the Software tab (figure 5-1).
3. Scroll to the desired program and click **Install** (figure 5-2).

Figure 5-2 — Software installation

4. Follow the on-screen instructions. By default, the installation of the installation routine creates a C:\Program Files\Extron\ISSISM directory, and it places the following five icons into a group folder named "Extron Electronics\ISSISM":

   - Button-Label Generator-
   - Check for ISSISM Control Program Update
   - ISSISM Control Program
   - ISSISM Help
   - Uninstall ISSISM Control Program

Software operation via Ethernet

When an ISM is connected to an Ethernet WAN or LAN, any number of users can operate it, locally or remotely, using the ISS/ISM Control Program. See "Ethernet connection" in chapter 2, "Installation", for installation details

Connection to the switcher via the Ethernet is password protected. There are two levels of password protection: administrator and user. Administrators have full access to all ISM switching capabilities and editing functions. Users can select video and/or audio for output, select inputs and outputs, select test patterns, set RGB and audio mutes, select a blue screen, and view all settings with the exception of passwords. If the same passwords or no password is required for logging on, all personnel log on with administrator privileges. Fields and functions that exceed user privileges are grayed out in the ISS/ISM Control Program when the operator is logged on as a user.

Ethernet protocol settings

The IP Settings/Options screen (figure 5-8 on page 5-6) provides a location for observing and, if you are connected via the RS-232 link or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. None of the fields on this screen can be edited while you are logged on as a user. See "System Configuration Page" in chapter 6, "Ethernet Operation", for details on the contents of these fields. See appendix A, "Ethernet Connection", for other basic information about Internet protocol.

NOTE *Editing variables on the IP Settings/Options screen while connected via the Ethernet port can immediately disconnect the user from the ISM. Extron recommends editing the settings on this screen using the RS-232 link and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.*

Using the control program

Many items found in the ISS/ISM Control Program are also accessible via front panel controls and the LCD menus (see chapter 3, "Operation") and under SIS control (see chapter 4, "Programmer's Guide"). The ISS/ISM Help Program provides information on settings and on how to use the control program, itself.

1. To run the control program, click **Start** > **Programs** > **Extron Electronics** > **ISSISM**. The Comm menu appears on the screen (figure 5-3).

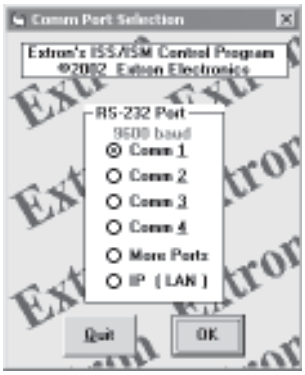


Figure 5-3 — Comm Port Selection window

2. Select the comm port that is connected to the ISM's Remote port or select **IP [LAN]** and click **OK**.

   If you selected a comm port, proceed to step **5**.

   If you selected IP [LAN], proceed to step **3**.

3. **If you selected IP [LAN] in step 2**, the IP connection window appears (figure 5-4). The window displays the last IP address that this computer was logged on to via the ISS/ISM Control Program. If no one has logged on to the ISM from this computer, enter the ISM IP address. If the address has not been changed, the factory-specified default is 192.168.254.254.

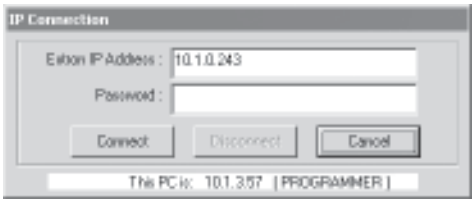


Figure 5-4 — Address and password entry

4. **If you selected IP [LAN] in step 2**, when prompted, enter the appropriate administrator or user password and click **Connect**.

   If you logged on using the administrator password, the program connects you to the ISM with all of the administrator rights and privileges.

   If you logged on using the user password, the program connects you to the ISM with only user capabilities.

   If an incorrect password was entered, the program beeps and returns to the password entry display.

The Extron ISS / ISM Control Program window (figure 5-5) appears.

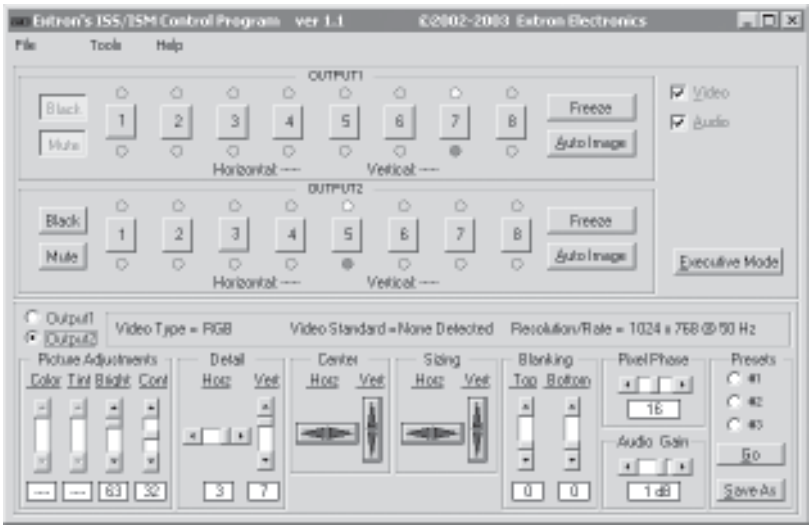


Figure 5-5 — Windows Control program window

5. If desired, on the task bar click **Tools** > **I/O Configuration** to configure the video inputs and outputs in the I / O configuration window (figure 5-6).

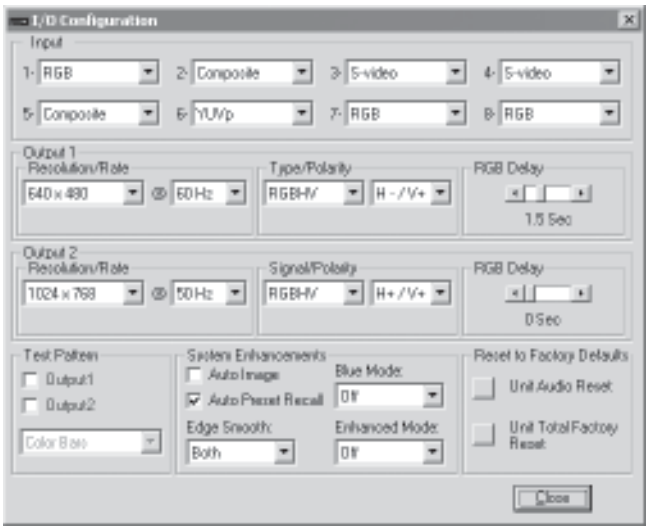


Figure 5-6 — Control program I/O Configuration window

6. If desired, on the task bar, click **Tools** > **Audio Settings** to set each input's audio level or attenuation in the Audio Settings window (figure 5-7).

Figure 5-7 — Control program Audio Settings window

7. If desired, on the task bar, click **Tools** > **IP Options** to set the switcher's IP parameters in the IP Settings / Options window (figure 5-8).

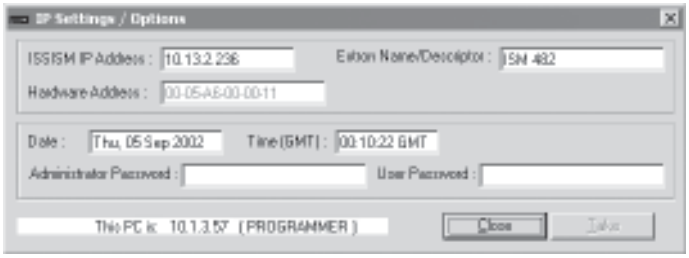


Figure 5-8 — Control program IP Setting/Options window

NOTE *When the control program is connected to the switcher via the RS-232 link, the Administrator and User password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.*

Using the help program

For information on program features, press the F1 computer key; or click the Help menu from within the ISS / ISM Control Program; or double-click the ISS / ISM Help icon, shown at right, in the Extron Electronics group or folder.

For explanations of buttons or functions, click the tabs in the help screen to reach the desired screen. Use a mouse or the Tab and Enter keys to select a button / function. A description and tips on using the program appear on screen.

Button-Label Generator

You may wish to customize the labeling of the ISM's front panel buttons. Blank templates for the ISM's button label windows are included in appendix B, "Reference Information". However, you can easily create, customize, and print labels for the switcher's input label window by using the Button-Label Generator software. This program creates and prints labels that can be inserted into the input label window on the switcher.

Installing the software

The program is included on the same CD-ROM as the ISS/ISM Control Program and is installed automatically when you install that program. It can also be downloaded from the Extron Web site (http://www.extron.com).

By default, the files are installed in either the C:\ISSISM directory, if installed automatically with the ISS/ISM Control Program, or the C:\BUTTONS directory if installed as a stand-alone program. The Button-Label Generator icon is placed in the "Extron Electronics" group or folder.

Using the software

1. To run the Button-Label Generator program, click **Start** > **Programs** > **Extron Electronics** > **Button-Label Generator**. Extron's Button-Label Generator window appears (figure 5-7).

2. Under Systems selection, choose **ISS 408/ISM 482**. This selection creates the correctly sized labels for the ISM's label strip. The button label editing area changes to reflect the number and arrangement of buttons on the device.

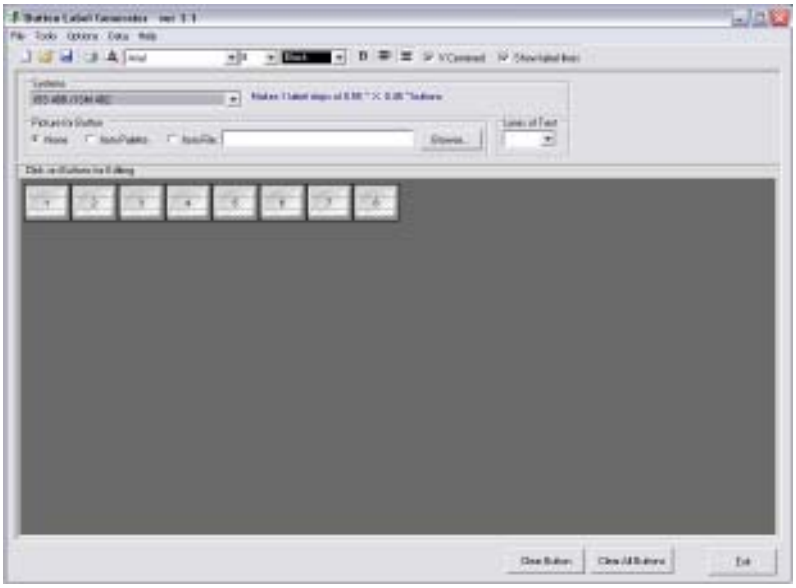


Figure 5-7 — Extron's Button-Label Generator window

3. Using standard Windows controls, you can create and print labels that can be cut out and placed in the label windows on the front panel of the ISM.

   For information about using the program, you can access a help file by clicking on the **Help** menu on the main screen and choosing **Show Help**.

   You can also see an example of a completed Extron Button-Label Generator window by clicking the **Help** menu on the main screen, choosing **Show Help**, and clicking the **Load Demo** button.

Chapter Six

Ethernet Operation

Loading the Startup (Control) Page

Control Page

System Configuration Page

File Management Page

I/O Configuration Page

Ethernet Operation

The ISM 482 can be controlled and operated through its Ethernet port, connected via a LAN or WAN, using a Web browser such as the Microsoft® Internet Explorer®. This chapter describes the factory-installed HTML pages, which are always available and cannot be erased or overwritten.

NOTE *If your Ethernet connection to the ISM is unstable, try turning off the proxy server in your Web browser. In Internet Explorer, click* **Tools** > **Internet Options** > **Connections** > **LAN Settings**, *uncheck the "***Use a proxy server...***" box, and then click* **Ok**.

Loading the Startup (Control) Page

Access the switcher using HTML pages as follows:

1. Start the Web browser program.
2. Click in the browser's Address field.
3. Type the switcher's IP address in the browser's Address field.

NOTE *If the value has not been changed, the factory-specified default,* 192.168.254.254, *is the correct value for this field.*

4. If you want the browser to display a page other than the default page (such as a custom page that you have created and uploaded), enter a slash (/) and the name of the file to open.

NOTE *The browser's Address field should display the address in the following format:* xxx.xxx.xxx.xxx/{optional_file_name.html}

NOTE *The following characters are invalid in file names:* {space} ~ @ = ‘ [ ] { } < > ’ “ ; : | \ and ?.

5. Press the keyboard Enter key. The switcher checks to see if it is password protected.

   If the switcher is not password protected, proceed to step **7**.

   If the switcher is password protected, the Enter Network Password page (figure 6-1) appears.

Figure 6-1 — Enter Network Password page

NOTE *A User Name entry is not required.*

6. Click in the Password field and type in the appropriate administrator or user password.

7. Click the **OK** button. The switcher checks several possibilities, in the following order, and then responds accordingly.

   a. Does the address include a specific file name, such as 10.13.156.10/file_name.html? **If so**, the switcher downloads that HTML page.

   b. Is there a file in the switcher's memory that is named "index.html"? **If so**, the switcher loads "index.html" as the default startup page.

   c. **If neither of the above conditions is true**, the switcher loads the factory-installed default startup page, "nortxe_index.html" (figure 6-2), also known as the Control page.

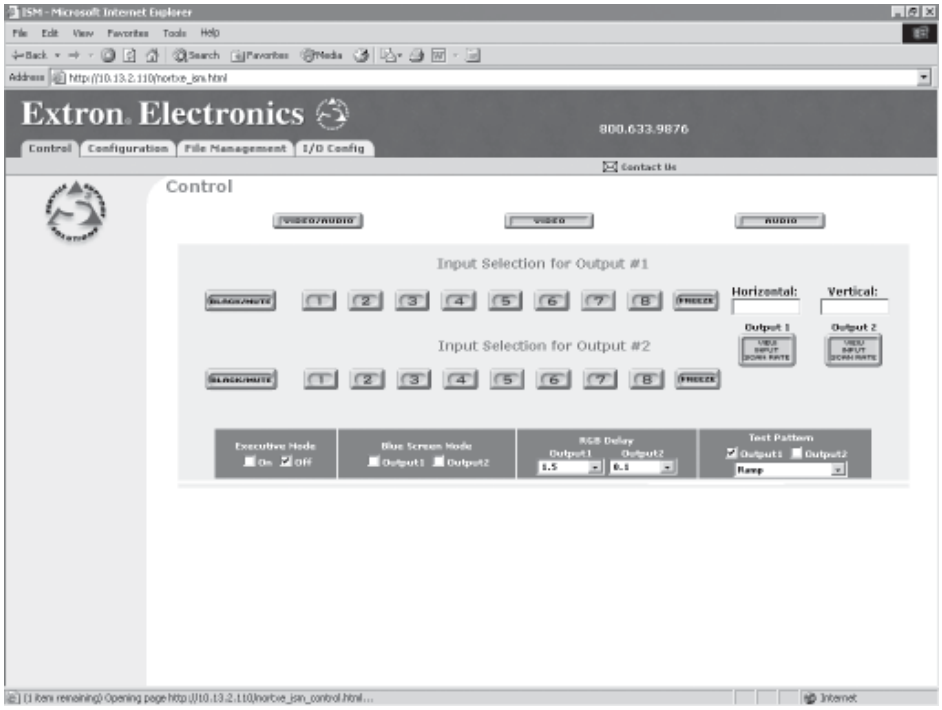


Figure 6-2 — Control page

Control Page

On the Control page (figure 6-2), you can select an input to either or both outputs. The Control page also provides facilities to check the frequency of an input and to mute outputs. Access the Control page by clicking the **Control** tab.

Creating a tie

Select and switch an input to an output as follows:

1. Click the **Video/Audio**, **Video**, or **Audio** button to select both the video and audio planes, the video plane only, or the audio plane only for switching (audio follow or audio breakaway).
2. Select an input for output 1 or output 2 by clicking the desired input button for either output 1 or output 2. After the RGB delay, the selected input is displayed on the designated monitors. The selected input button turns blue to indicate a video and audio or video only selection, or yellow to indicate an audio only selection. The RGB delay is user-selectable. See "Changing the RGB delay", below.

Changing the RGB delay

The RGB delay interval for each output defines how long the screen is blanked when you are selecting a new input for the connected monitor.

Change the RGB delay for an output as follows:

1. Click in the RGB Delay field for the desired output. A drop-down scroll box appears (figure 6-3).

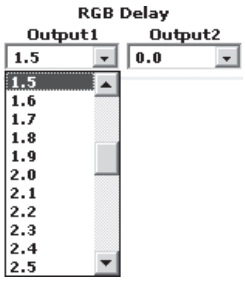


Figure 6-3 — RGB delay scroll box

2. Click and drag the slider or click the scroll up (▲) or scroll down (▼) button until the desired interval is visible.
3. Click the desired interval.

Blacking out the screen and muting the audio

You can mute the video (blackout the screen) and / or audio to output 1 and / or output 2 from the control page as follows:

1. Click the **Video/Audio**, **Video**, or **Audio** button to select both the video and audio planes, the video plane only, or the audio plane only for muting.
2. Click the Output 1 or Output 2 **Black/Mute** button. The **Black/Mute** button turns blue to indicate a video and audio mute or video only mute, or it turns yellow to indicate audio mute. If you muted the output that is selected on the front panel, the front panel Black and / or Mute LEDs light.

   Click the **Black/Mute** button again to unmute the video and / or audio.

Freezing the output

You can freeze either output by clicking the Output 1 or Output 2 **Freeze** button. The **Freeze** button turns blue. When the output is frozen, the input source can be removed and the ISM functions as a video store.

Click the **Freeze** button again to toggle freeze mode off.

Outputting a test pattern

You can select a test pattern to output on the output 1 and / or output 2 monitors. The test patterns are helpful when adjusting the connected displays for color, convergence, focus, resolution, contrast, grayscale, and aspect ratio.

Output a test pattern as follows:

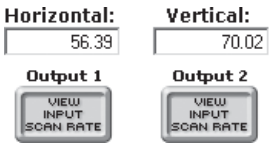
1. Click in the Test Pattern field. A drop down-box appears (figure 6-4).

Figure 6-4 — Test pattern drop box

2. Click the desired test pattern.

3. Click the Output 1 and / or Output 2 check box to turn on the test pattern.

Previewing the scan rate



You can read the horizontal and vertical scan rates of output 1 and output 2 by clicking the Output 1 or Output 2 **View Input Scan Rate** button. The horizontal and vertical frequencies are displayed in the Horizontal and Vertical windows on the page.

Using Blue-Only mode

You can toggle Blue-Only mode on and off for either output by clicking the Blue Screen Mode **Output 1** and / or **Output 2** check box(es). Blue-Only mode is helpful in the setup of the color and tint of the incoming video signal. In the Blue-Only mode, only the sync and blue video signals are passed to the display.

Executive mode

You can toggle Executive mode on and off by clicking the Executive Mode **On** or **Off** check box. The Executive mode limits the operation of the Integration Scaling Matrix Switcher from the front panel. When the switcher is in Executive mode, all of the front panel functions are disabled except for input selection.

System Configuration Page

The ISM downloads the System Configuration page (figure 6-5) when you click the **Configuration** tab. The screen consists of fields in which you can observe and edit IP administration and system settings.

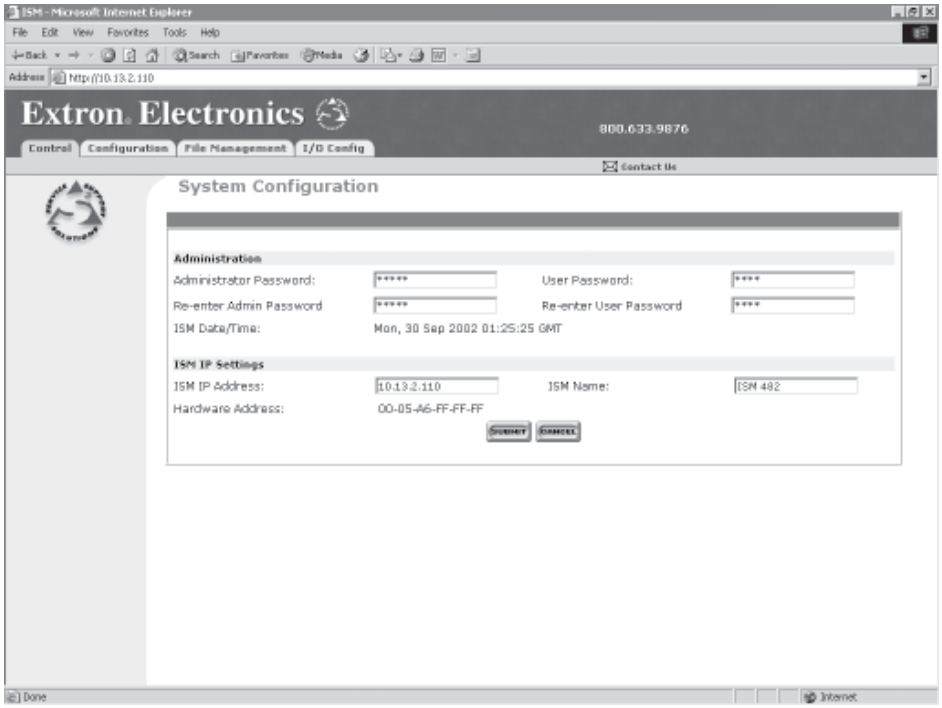


Figure 6-5 — System Configuration page

NOTE *Access to the ISM settings using Web control is **not** password protected. Ensure only knowledgeable and qualified personnel have access to the switcher under Web control.*

Administration fields

The administration fields on the System Configuration page are for entering and verifying administrator and user passwords.

- Ethernet connection to the switcher, either by entering SIS commands via Telnet (see chapter 4, "Programmer's Guide") or using the control program (see chapter 5, "Switcher Software") is password protected.
- Connection via Web pages and connection via the RS-232 port are **not** password protected.

Administrators have full access to all ISM switching capabilities and editing functions. Users can select video and/or audio for output, select test patterns, set RGB and audio mutes, select a blue screen, and view all settings except passwords.

The administration fields on the System Configuration page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to 12 upper case and lower case alphanumeric characters. Each password must be entered twice: once in the password field and then repeated in the re-enter password field. Characters in these fields are masked by asterisks (*****). If you do not want to password-protect an access level, leave the password field and the re-enter password field blank. After entering the desired password in both fields, click the **Submit** button.

NOTE *The program will not allow you to create a user password unless you have already created an administrator password.*

NOTE *If a password has been inadvertently changed to an unknown value, you can still connect to the switcher via the RS-232 link, which is not password protected. When connected via the RS-232 link, using either SIS commands (see chapter 4, "Programmer's Guide") or under program control (see chapter 5, "Switcher Software"), you can look up and, if desired, change a password.*

ISM IP Settings fields

The ISM IP Settings fields provide a location for observing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the **Submit** button.

ISM IP Address field

The ISM IP Address field contains the IP address of the connected ISM. This value is encoded in the flash memory on the controller circuit board.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

ISM Name field

The ISM Name field contains the name of the switcher. This is helpful in identifying the switcher in multiple-unit networks. This name field can be changed to any valid name, up to 12 alphanumeric characters.

Hardware Address field

The hardware address (also known as the MAC address) is hardcoded on the controller board and cannot be changed.

File Management Page

To delete files such as HTML pages from the ISM or to upload your own files to the ISM, click the **File Management** tab. The switcher downloads the file management Web page (figure 6-6).

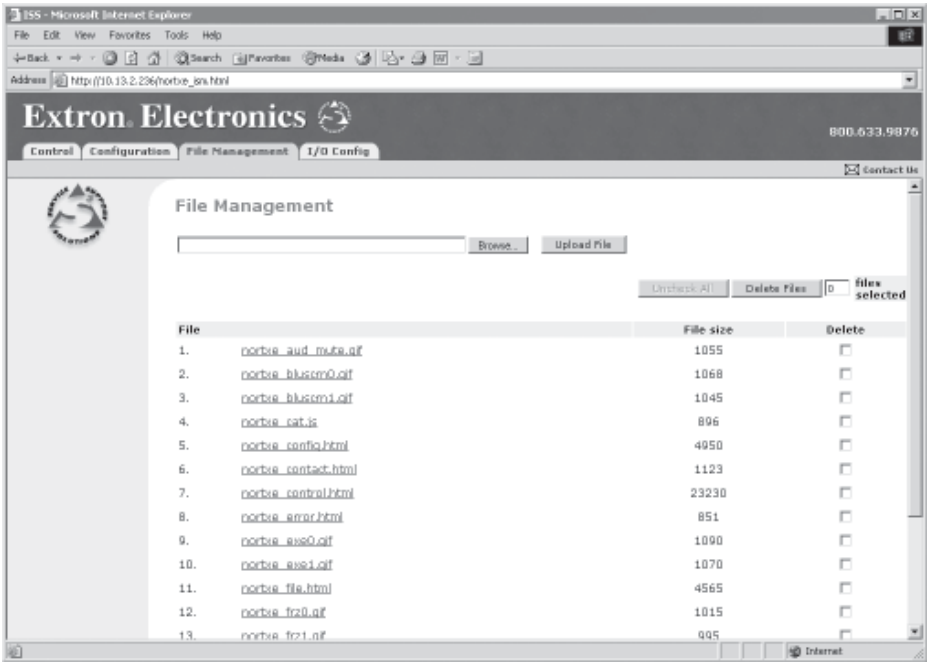


Figure 6-6 — File Management page

To delete a file, check the associated **Delete** check box and click the **Delete Files** button.

Upload your own files as follows:

1. Click the **Browse** button.
2. Browse through your system and select the desired file.
3. Click the **Upload File** button.

I/O Configuration Page

You can set up the input configurations and the output format on the I/O Configuration page (figure 6-7). Access the Setup page by clicking the **I/O Config** tab.

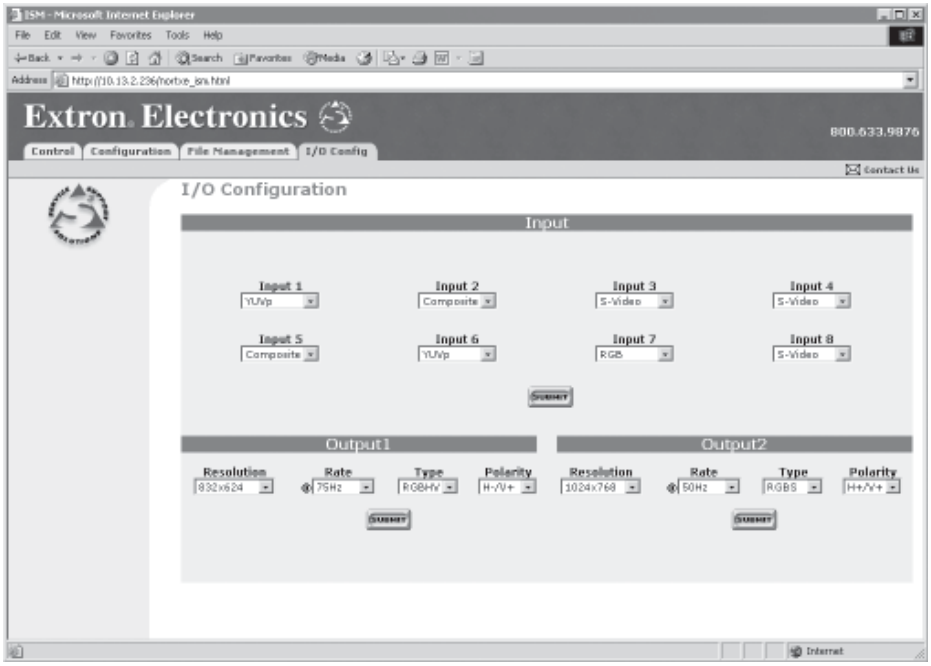


Figure 6-7 — I/O Configuration page

Input configuration

You can specify the format of each input. The available formats are RGB, RGBcvS (identified as RGBcS in the drop-down box), YUVi, YUVp, Betacam 50, Betacam 60, HDTV, S-video, and composite video. Specify the input format as follows:

1. Click in the desired input's Configuration field. A drop-down box appears (figure 6-8).

Figure 6-8 — Input configuration drop box

2. Click the desired input format.
3. Click the **Submit** button.

Output resolution, rate, sync format, and polarity

The ISM 482 scales the input signal up or down to any of a number of output resolutions and rates. The switcher outputs the scaled video as RGBHV or RGBS, with user-selectable polarity, via either the program or preview connectors. The table below shows the resolutions and rates available on the ISM 482.

Resolution	50 Hz	56 Hz	60 Hz	75 Hz	85 Hz	Lock at 50/60 Hz†	Actual DVI output
640 x 480	●		●	●		●	1024 x 480
800 x 600	●		●	●		●	1024 x 600
832 x 624			●	●		●	1024 x 624
848 x 480			●			●	1024 x 480
852 x 480			●			●	1024 x 480
1024 x 768*	●		●	●	●	●	1024 x 768
1280 x 768*		●				●	1280 x 768
1280 x 1024*	●		●				1280 x 1024
1360 x 765*			●			●	1360 x 765
1365 x 768*	●		●			●	1365 x 768
1365 x 1024			●			●	1280 x 1024
1366 x 768*			●			●	1366 x 768
1400 x 1050*	●		●			●	1400 x 1050
576p HDTV*	●					●	720 x 576
720p* HDTV @ 60 Hz only			●			●	1280 x 720
1080p HDTV @ 60 Hz only			●			●	1280 x 1080
1080i HDTV	●		●			●	1280 x 540

** Native DVI output resolution*

† The output refresh rate is auto-selected, based on the video refresh rate of input 1.

NOTE

- *For output resolutions with less than 1024 pixels horizontally, the optional DVI output's true horizontal resolution is limited to 1024 pixels. The vertical resolution is the selected vertical resolution. For these resolutions, the ISM DVI output is 1024 x {selected vertical size}. For example, if the output resolution is set to 640 x 480, the DVI output card's actual resolution is 1024 × 480.*
- *For the 1365 x 1024, 1080p, and 1080i output resolutions, the optional DVI output's true horizontal resolution is limited to 1280 pixels. For these resolutions, the ISM DVI output is 1280 x {selected vertical size}. For example, if the output resolution is set to 1080p, the DVI output card's actual resolution is 1280 x 1080.*
- *The DVI card outputs all other selected resolutions normally.*
- *Resolutions marked with an asterisk (*) in the table above are native DVI outputs, meaning that the DVI output fully supports the selected horizontal and vertical resolution. The DVI output resolution for these rates exactly matches the analog resolution.*

Output resolution

Select the output resolution as follows:

1. Click in the resolution field. A drop-down scroll box appears (figure 6-9).

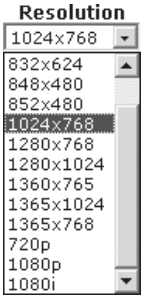


Figure 6-9 — Resolution scroll box

2. Click and drag the slider or click the scroll up (▲) or scroll down (▼) button until the desired rate is visible.
3. Click the desired output.
4. Click the **Submit** button.

Output rate

Select the output rate as follows:

1. Click in the Rate field. A drop down box appears (figure 6-10).

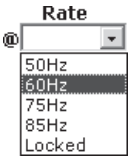


Figure 6-10 — Rate @ drop box

2. Click the desired output frequency.

   Frequencies that are not available for a specific resolution are marked N / A in the Rate @ drop box.

   The drop box selection **Locked** enables the Extron Accu-RATE Frame Lock (AFL™) feature. Accu-RATE Frame Lock eliminates image tearing and other artifacts of scaling motion video by eliminating frame rate conversion. It exactly matches the output rate of the ISM to the frame rate of the selected input. Select this feature if you will be using motion video sources with a display that is capable of a variety of refresh rates.
3. Click the **Submit** button.

Output format

Select between separate horizontal (H) and vertical (V) sync or composite (S) sync as follows:

1. Click in the Type field. A drop-down box appears (figure 6-11).

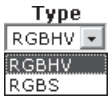


Figure 6-11 — Type drop box

2. Click the desired sync type.
3. Click the **Submit** button.

Output polarity

Select the output polarity as follows:

1. Click in the Polarity field. A drop-down box appears (figure 6-12).

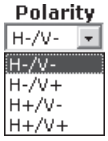


Figure 6-12 — Polarity drop box

2. Click the desired output sync polarity.
3. Click the **Submit** button.

Chapter 7 Seven

Maintenance and Modifications

Opening and Closing the Switcher

Installing a Firmware Upgrade

Installing a DVI Output Card

Opening and Closing the Switcher

NOTE *Extron recommends that you send the unit in to Extron for service and updates.*

To replace the firmware or install the optional DVI output card, you need to open the ISM's case. Open and close the switcher as follows:

1. Disconnect the AC power cord from the ISM to remove power from the unit.

WARNING *To prevent electric shock, always unplug the ISM from the AC power source before opening the enclosure.*

2. If the ISM is installed in a rack, disconnect all signal and control cables and remove the ISM from the rack.

3. Remove the 16 screws, 8 on the top and 4 on each side of the ISM cover (figure 7-1).

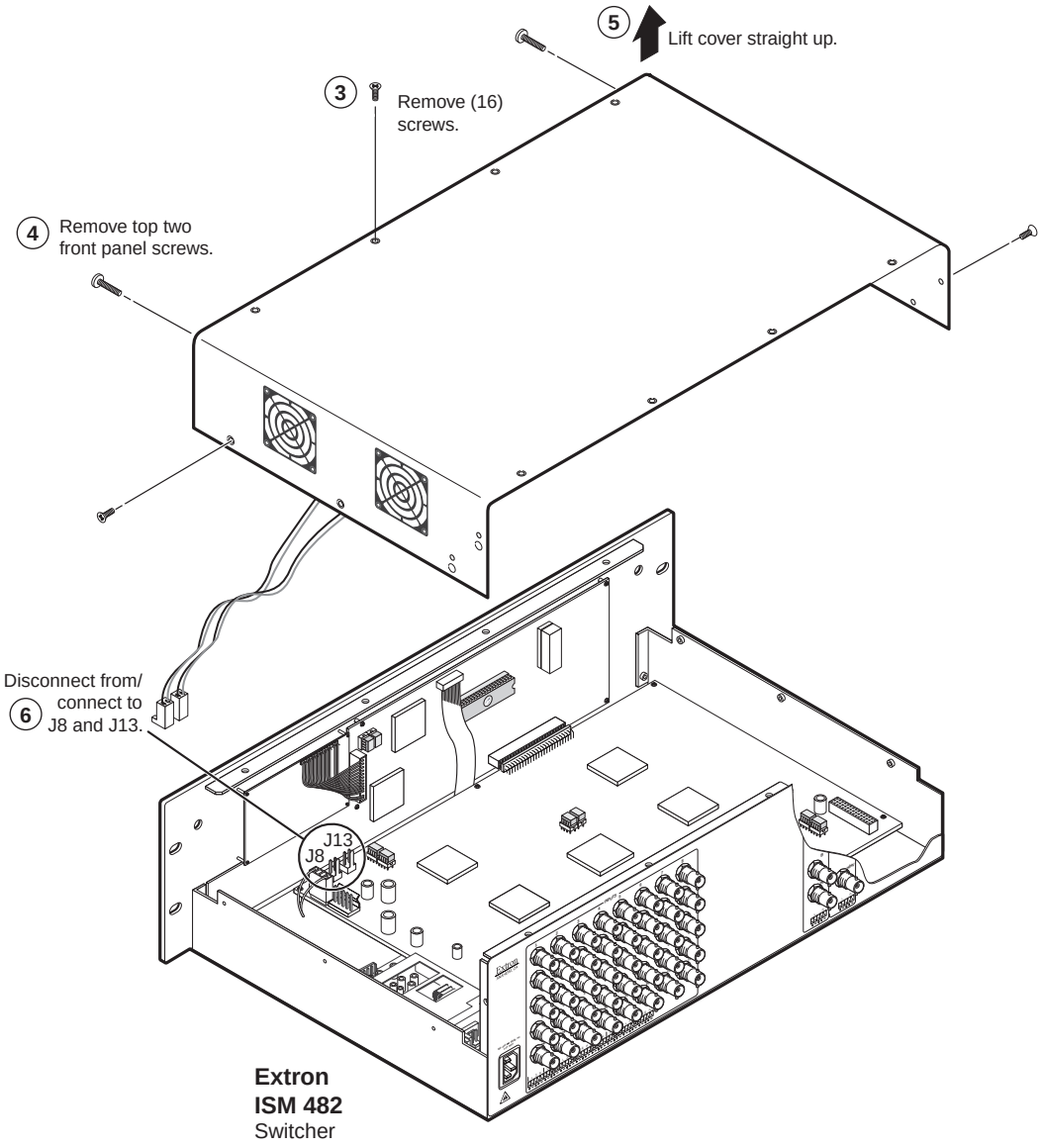


Figure 7-1 — Removing the ISM cover

4. Remove the top two front panel screws.

5. Lift the top cover straight up approximately 5 inches until you can access the fan power cords.

CAUTION *Do not touch any switches or other electronic components inside the ISM. Doing so could damage the switcher. Electrostatic discharge (ESD) can damage IC chips even though you cannot feel it. You must be electrically grounded before proceeding with firmware replacement. A grounding wrist strap is recommended.*

6. Disconnect the two fan power cords from connectors J8 and J13 on the main board.

7. Lift the top cover out of the way.

8. Perform the desired maintenance procedure. See "Installing a Firmware Upgrade" or "Installing a DVI Output Card", later in this chapter.

9. Reconnect the two fan power cords to connectors J8 and J13 on the main board. It does not matter which fan is connected to which connector.

10. Replace the top cover on the ISM.

11. Fasten the top cover with the screws that were removed in step **3** and step **4**.

12. Rack mount the switcher if desired and reconnect all cables.

Installing a Firmware Upgrade

In some cases the ISM's firmware may require replacement with an updated version. There are nine user-replaceable firmware chips (figure 7-2): U1, U2, and U6 on the front panel circuit board and U98, U99, U100, U101, U102, and U103 on the main circuit board. The U-numbers are printed on the circuit boards. Extron recommends that you send the unit in to Extron for service and updates.

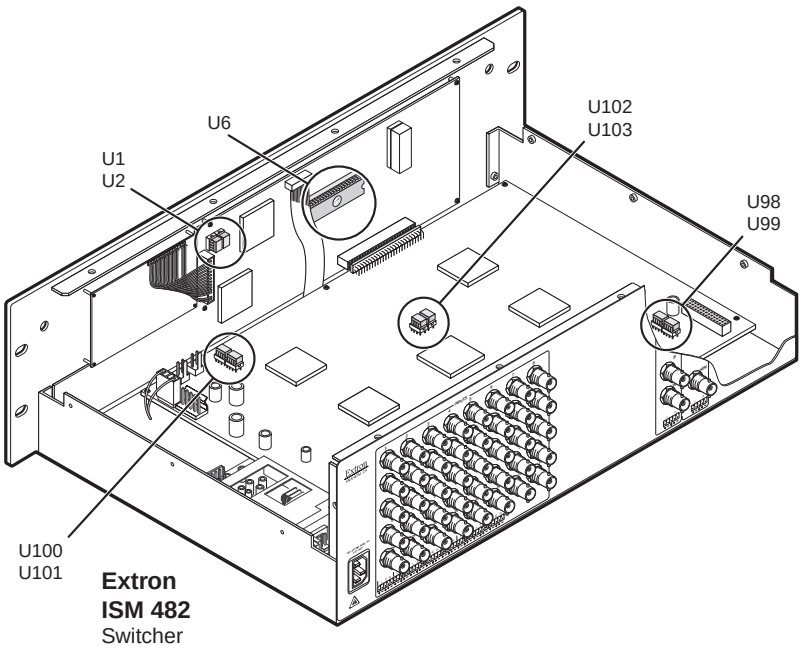


Figure 7-2 — ISM firmware chip locations

- Chips U1 and U2 are replaced as a pair.
- Chip U6 is replaced alone.
- Chips U98, U99, U100, and U101 are replaced as a set.
- Chips U102 and U103 are replaced as a pair.

CAUTION *Changes to firmware must be performed by authorized service personnel only. Some ISM firmware updates must be performed at the Extron factory.*

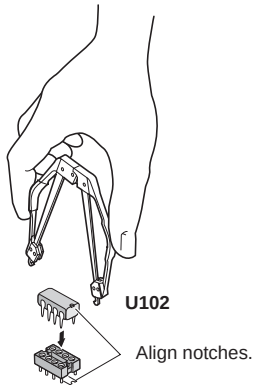
Replace firmware in the ISM as follows:

WARNING *To prevent electric shock, always unplug the ISM from the AC power source before opening the enclosure.*

1. Open the switcher. See "Opening and Closing the Switcher" on page 7-2.

2. Locate the firmware chip(s) to be replaced on the main or front panel circuit board (figure 7-2).

3. After you are electrically grounded, use a DIP chip puller to grasp each IC chip and pull it out of the socket(s).



4. Align the slots of each new firmware chip with the angled corners of the socket in the same orientation as the old chip. Gently, but firmly, press the chip into place in the socket.

5. Close the switcher. See "Opening and Closing the Switcher", starting with step **9** on page 7-3.

Installing a DVI Output Card

You can install an optional digital visual interface (DVI) output card in the ISS. With the card installed, a additional DVI video output 1 on a standard DVI connector. The DVI output is the video tied to output 1 and is in addition to the standard output 1 RGB video on BNC connector and 15-pin HD connectors. Extron recommends that you send the unit to Extron for service and updates.

Install an optional DVI output card in the ISM as follows:

WARNING *Changes to electronic components must be performed by authorized service personnel only.*

WARNING *To prevent electric shock, always unplug the ISM from the AC power source before opening the enclosure.*

1. Open the switcher. See "Opening and Closing the Switcher" on page 7-2.

CAUTION *Do not touch any switches or other electronic components inside the ISM. Doing so could damage the ISM. Electrostatic discharge (ESD) can damage IC chips even though you cannot feel it. You must be electrically grounded before proceeding with any electronic component replacement. A grounding wrist strap is recommended.*

2. Locate the DVI output card connector opening on the rear panel and the DVI output card connector J14. When viewed from the front, connector J14 is in the far left corner of the main circuit board (figure 7-3).

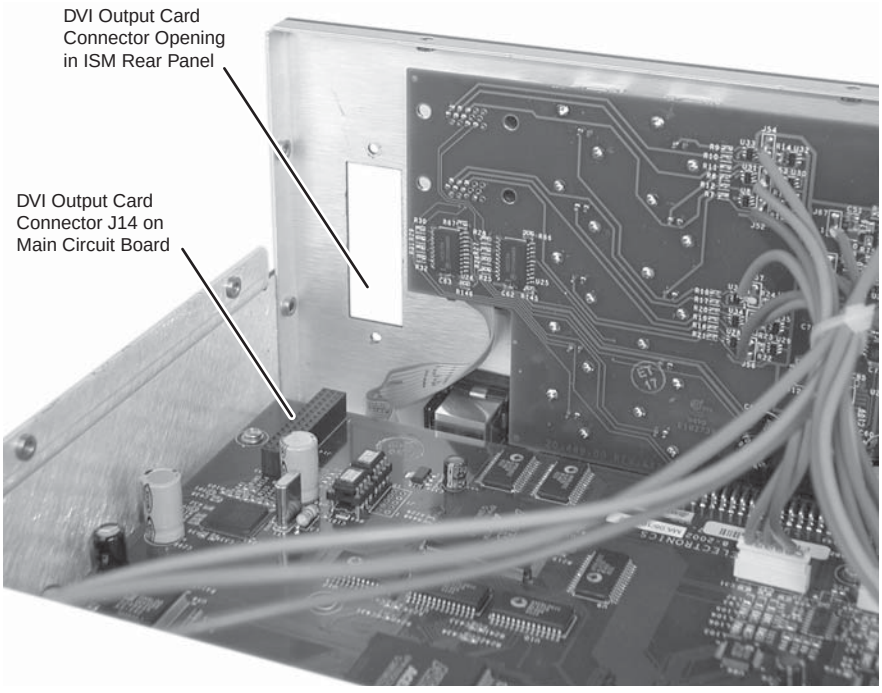


Figure 7-3 — DVI output card connector opening and socket J14

3. If the rear panel DVI connector opening is still covered, remove the two screws that secure the cover to the back panel and remove the cover.

4. Position the DVI card above connector J14 with the DVI connector facing toward the rear of the switcher. Ensure that the pins on the DVI card properly align with the J14 connector to prevent bending the pins.

5. Carefully mate the 45-pin connector on the DVI output board with connector J14 on the main circuit board (figure 7-4).

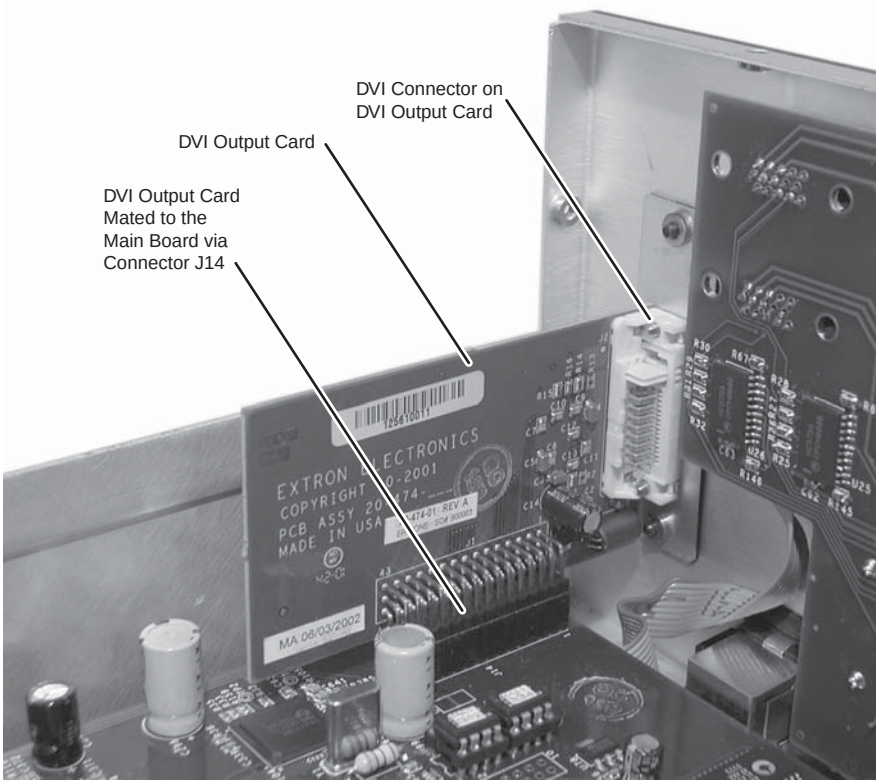


Figure 7-4 — Output DVI board installation

6. Secure the DVI card to the rear panel with the two screws removed in step **3**.

7. Close the switcher. See "Opening and Closing the Switcher", starting with step **9** on page 7-3.

Appendix A

Ethernet Connection

Cabling

Determining Default Addresses

Connecting as a Telnet Client

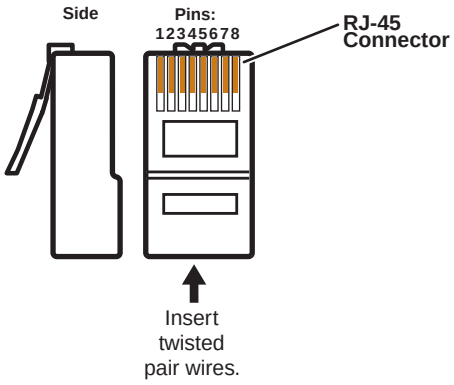
Ethernet Connection

The rear panel Ethernet connector (figure A-1) on the ISM switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN.

Cabling

The Ethernet cables can be terminated as straight-through cables or crossover cables (figure A-1) and must be properly terminated for your application:

- **Patch (straight) cable** — Connection of the ISM to an Ethernet hub, router, or switcher that also hosts a controlling computer
- **Crossover cable** — Direct connection between the ISM and a controlling computer



Patch (straight) cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Figure A-1 — RJ-45 connector pinout tables

Determining Default Addresses

To access the ISM switcher via the Ethernet port, you need the Extron ISM IP address. If the address has been changed to an address comprised of words and characters, the actual numeric IP address can be determined using the Ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to the ISM.

Pinging to determine the switcher's IP address

The Microsoft Ping utility is available at the DOS prompt. Ping tests the Ethernet interface between the computer and the ISM. Ping can also be used to determine the actual numeric IP address from an alias and to determine the Web address.

Access the DOS prompt and ping the switcher as follows:

1. Click **Start** > **Run**.
2. At the Open prompt, type `command`.
3. Click the **OK** button.
4. At the DOS prompt, type `ping {IP address}` and press the keyboard Enter key (Enter). The computer returns a display similar to figure A-2.

   The line **Pinging ...** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure A-2 — Ping response

Pinging to determine the Web IP address

The Ping utility has a modifier, `-a`, that directs the command to return the Web address rather than the numeric IP address.

At the DOS prompt, type `ping -a {IP address}` and then press Enter. The computer's return display is similar to the Ping response shown in figure A-2, except that when you specify the `-a` modifier, the line **Pinging mail...** reports the Web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Connecting as a Telnet Client

The Microsoft Telnet utility is available from the DOS prompt. Telnet allows you to input SIS commands to the ISM from the PC via Ethernet.

Access the DOS prompt and start Telnet as follows:

1. Click **Start** > **Run**.
2. At the Open prompt, type `command`.
3. Click the **OK** button.
4. At the DOS prompt, type `telnet` and press Enter. The computer returns a display similar to figure A-3.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Figure A-3 — Telnet screen

Telnet tips

It is not the intention of this manual to detail all of the operations and functionality of Telnet; however, some basic level of understanding is necessary for operating the ISS via Telnet.

Open

Connect to the ISM using the Open command. Once you are connected to the switcher, you can enter the SIS commands the same way that you would if you were using the RS-232 link.

Connect to the ISM as follows:

1. At the Telnet prompt, type `open {IP address}` and then press Enter.

   If the switcher is not password protected, no further prompts are displayed until you break or disconnect the connection to the ISM.

   If the switcher is password protected, Telnet displays the password prompt.

2. If necessary, at the password prompt, type the appropriate password and then press Enter.

   Connection to the switcher via the Ethernet can be password protected. There are two levels of password protection: administrator and user. A person logged on as an administrator has full access to all ISM switching capabilities and editing functions. Users can select video and/or audio for output, select test patterns, set RGB and audio mutes, select a blue screen, and view all settings with the exception of passwords. By default, the ISM is shipped with no password assigned.

Once you are logged in, the ISM returns either **Login Administrator** or **Login User**. No further prompts are displayed until you break or disconnect the connection to the ISM.

Escape character and Esc key

When Telnet is first started, the utility advises that the **Escape character is 'Ctrl+]'**. Many SIS commands include the keyboard Esc key. Consequently, some confusion may exist between the Escape character and the Escape key.

The Telnet Escape character is a key combination, the Ctrl key and the] key pressed simultaneously, that returns you to the Telnet prompt while leaving the connection to the ISM intact.

The Escape key is the Esc key on the computer keyboard.

Local echo

Once the computer is connected to the ISM, by default Telnet does not display your keystrokes on the screen. SIS commands are typed in blindly and the SIS responses are displayed on the screen. To command Telnet to show keystrokes, type `set local_echo` at the Telnet prompt, and then press Enter before you open the connection to the switcher.

With local echo turned on, keystrokes and the switcher's response are displayed on the same line. For example: **1*1!In1 Out1 All,** where **1*1!** is the SIS command and **In1 Out1 All** is the response.

With local echo turned on, all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as **a*d*m*i*n***, where **admin** is the keyed in password and ********* is the masked response.

Local echo can be turned off by typing `unset local_echo` and then pressing Enter at the Telnet prompt. If you are connected to the ISM and need to access the Telnet prompt to turn local echo off, type the Escape character (Ctrl+]).

Set carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected ISM when you press the Enter key. This is the correct setting for SIS communication with the switcher. The Telnet `set crlf` command forces Telnet to transmit carriage return and line feed characters when Enter is pressed, but if crlf is set, the SIS link with the switcher does not function properly. Do not set crlf on. If necessary, issue the `unset crlf` command to turn off crlf.

Close

To close the link to the switcher, access the Telnet prompt by typing the Escape character (Ctrl+]). At the Telnet prompt, type `close` and then press Enter.

Help

For Telnet command definitions, at the Telnet prompt, type ? and then press Enter.

Quit

Exit the Telnet utility by typing `quit` and then press Enter at the Telnet prompt. If you are connected to the ISM, access the Telnet prompt beforehand by typing the Escape character (Ctrl+]).

Ethernet Connection, cont'd

Appendix B

Reference Information

Specifications

Part Numbers

Button Labels

Reference Information

Specifications

Video

Routing	8 x 2 matrix

Video input

Number / signal type	8 RGBHV, RGBS, RGsB, RGBcvS, component video, S-video, composite video
Connectors	8 x 5 female BNC
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum / maximum levels	Analog: 0 V to 1.0 Vp-p with no offset
Impedance	75 ohms
Horizontal frequency	Autoscan 15 kHz to 100 kHz (RGB)
Vertical frequency	Autoscan 50 Hz to 100 Hz
Resolution range	Autoscan 720 x 525 to 1600 x 1200

Video processing

Decoder	9 bit digital
Digital sampling	24 bit, 8 bits per color; 13.5 MHz standard (video), 140 MHz standard (RGB)
Colors	16.78 million
Horizontal filtering	4 levels
Vertical filtering	8 levels

Video output

Number / signal type	2 scaled RGBHV, RGBS, 1 optional DVI
Connectors	2 x 5 BNC female, (2) 15-pin HD female
Nominal level	0.7 Vp-p for RGB
Minimum / maximum levels	0 V to 0.7 Vp-p
Impedance	75 ohms
Scaled resolutions	640x480[1,3,4,6], 800x600[1,3,4,6], 832x624[3,4,6], 848x480[3,6], 852x480[3,6], 1024x768[1,3,4,5,6], 1280x768[2,6], 1280x1024[1,3], 1360x765[3,6], 1365x1024[3,6], 1366x768[3,6], 1365x768[1,3,6], 1400x1050[1,3,6], 576p[1,6], 720p[3,6], 1080p[3,6], 1080i[1,3,6] [1] = at 50 Hz, [2] = at 56 Hz, [3] = at 60 Hz, [4] = at 75 Hz, [5] = 85 Hz, [6] = locked to the current input's vertical refresh rate (Accu-RATE Frame Lock™)

NOTE *For output resolutions with less than 1024 pixels horizontally, the optional DVI output's true horizontal resolution is limited to 1024 pixels. For the 1365 x 1024, 1080p, and 1080i output resolutions, the optional DVI output's true horizontal resolution is limited to 1280 pixels. The DVI card outputs all other selected resolutions normally.*

Return loss	-30 dB @ 5 MHz
DC offset	±5 mV with input at 0 offset

Sync

Input type	Autodetect RGBHV, RGBS, RGsB, RGBcvS
Output type	RGBHV, RGBS
Standards	NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level	0 V to 5.0 Vp-p
Output level	0 V to 5.0 Vp-p, unterminated
Input impedance	510 ohms
Output impedance	75 ohms

Max input voltage	5.0 Vp-p
Max. propagation delay	20 ns
Polarity	Positive or negative (selectable)

Audio

Routing	8 x 2 stereo matrix
Gain	Unbalanced output: 0 dB; balanced output: +6 dB
Frequency response	20 Hz to 20 kHz, ±0.05 dB
THD + Noise	0.03% @ 1 kHz at nominal level
S/N	>90 dB at maximum output (unweighted)
Crosstalk	<-80 dB @ 1 kHz, fully loaded
Stereo channel separation	>90 dB @ 1 kHz
CMRR	>75 dB @ 20 Hz to 20 kHz

Audio input

Number / signal type	8 stereo, balanced / unbalanced
Connectors	(8) 3.5 mm captive screw connectors, 5 pole
Impedance	>10k ohms unbalanced / balanced, DC coupled
Nominal level	Configurable: -60 dBV (1 mVrms), +4 dBu (1.23 Vrms), 0 dBu (0.775 Vrms), -10 dBV (316 mVrms), -20 dBV (100 mVrms)
Maximum level	+19.5 dBu, (balanced or unbalanced) at 1% THD+N
Input gain adjustment	–24 dB to +9 dB, adjustable per input

NOTE *0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV ≈ 2 dBu.*

Audio output

Number / signal type	2 stereo, balanced / unbalanced
Connectors	(2) 3.5 mm captive screw connectors, 5 pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.1 dB channel to channel
Maximum level (Hi-Z)	>+21 dBu, balanced or unbalanced at 1% THD+N
Maximum level (600 ohm)	>+15 dBm, balanced or unbalanced at 1% THD+N

Control/remote — switcher/scaler

Serial control port	RS-232, 9-pin female D connector
Baud rate and protocol	9600 baud, 8 data bits, 1 stop bit, no parity
Serial control pin configurations	2 = TX, 3 = RX, 5 = GND
Ethernet control port	1 RJ-45 female connector
Ethernet data rate	10 / 100Base-T, half / full duplex with autodetect
Ethernet protocol	ARP, ICMP (ping), TCP / IP, Telnet
Program control	Extron's control / configuration program for Windows® Extron's Simple Instruction Set (SIS™) Microsoft® Internet Explorer, Telnet

General

Power	100 VAC to 240 VAC, 50 / 60 Hz, 60 watts, internal
Temperature / humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Forced air, right to left (as viewed from the front panel)
Rack mount	Yes
Enclosure type	Metal

Enclosure dimensions	5.25" H x 17.5" W x 11.2" D (3U high, full rack wide) 13.3 cm H x 48.3 cm W x 28.4 cm D (Depth excludes connectors and knobs. Width excludes rack ears.)
Product weight	11.2 lbs (5.1 kg)
Shipping weight	17 lbs (8 kg)
DIM weight	
USA / Canada	18 lbs (9 kg)
International	21 lbs (10 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Compliances	CE, FCC Class B
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Part Numbers

Included parts

These items are included in each order for an ISM 482:

Included parts	Part number
ISM 482	60-425-01
Rubber feet (self-adhesive) (4)	
IEC power cord	
Tweeker (small screwdriver)	
ISM 482 User's Manual	
Extron Software Products CD (ISS / ISM Control Program and Button-Label Generator)	

Optional accessories

Part	Part number
DVI output card	70-244-01
Captive screw audio connector (5 pole, no tail, pkg of 10)	100-460-01
RCAF-BNCM (RCA-to-BNC adapters), pkg of 10	100-229-01
SVHSM-BNCF 8" (S-video to BNC adapter)	26-353-01

Cables and connectors

When using signals with a scanning frequency of 15-125 kHz and running distances of 100 feet or more, use high resolution BNC cables to achieve maximum performance.

Bulk cable

Extron Part RG6/super high resolution cable	Part #
RG6 bulk , 500' (150m), single conductor	22-098-02
RG6-1 bulk , 1000' (300m), single conductor	22-098-03
RG6-5 bulk , 500' (150m), five conductor	22-100-02
MHR-5 Cable (Non-plenum)	
MHR-5 bulk, 500' (150m)	22-020-02
MHR-5 bulk, 1000' (300m)	22-020-03
MHR-5p (Plenum) Cable	
MHR-5P bulk, 500' (150m)	22-103-02
MHR-5P bulk, 1000' (300m)	22-103-03

Assorted connectors

BNC connectors	
BNC male, mini HR crimp connectors, qty. 50	100-250-01
BNC male RG6 crimp connectors, qty. 50	100-260-01
BNC bulkhead connectors, qty. 50 (for custom wall plates)	100-076-51

Pre-cut cables

MHR-5 cable is used for RGBHV cable runs. It can also be used for composite video, S-video, or RGsB. All Extron BNC cables have male connectors on both ends. A plenum version of the MHR cable is also available.

MHR-5 Cable	
MHR-5 BNC (6' / 1.8 meters to 300' / 90.0 meters)	26-260-*xx*

NOTE *Bulk cable in lengths up to 5000' (1524 meter) rolls is available with or without connectors.*

Button Labels

Eight sets of button labels are provided on the next page. If desired, cut them out of the manual, write the applicable button information in each button area, and place them in the switcher's label window.

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and / or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805, USA

Europe, Africa, and the Middle East:

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort
The Netherlands

Asia:

Extron Electronics, Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363

Japan:

Extron Electronics, Japan
Kyodo Building
16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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